Comparing indicators of labour market regulations across databases: A post scriptum to the employing workers debate

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Abstract

This paper offers a critical overview of labour market regulations' indicators developed by the World Economic Forum, the IMD, and the Fraser Institute. We show that the World Bank Employing Workers Index constitutes an important part of these indicators, despite its shortcomings and the recommendations made against using it either as part of aggregate indices or for ranking countries. We further document how these three databases compare, and identify both their common and specific limitations. We report that, for each of these indicators, the choice of components, of data sources, and of aggregation techniques result in different pictures of labour market flexibility. Our comparative exercise calls for continuous efforts to improve indicators of labour market regulations as well as a cautious use of such indicators for research and policy advice.

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1. Introduction

The past decades witnessed a significant burgeoning of empirical studies examining the effect of labour market institutions on various measures of economic and labour market performance, which was facilitated by the development of cross-country time-series data on labour market institutions. With the advent of the global economic crisis and the need to seek policy responses to persisting unemployment, the interest in such studies has increased further. Hence, the question of the robustness of empirical studies and indicators used has increasingly become critical.

This paper examines three international databases developed for measuring labour market regulations, competitiveness and efficiency. These are the *Labour Market Efficiency Index* developed by the World Economic Forum (*WEF LME*), the *Government Efficiency Index* and its labour regulation components developed by the International Institute for Management Development (*IMD*), and the *Fraser Institute Labor Market Regulations Index* (*Fraser LMR*). We provide a critical overview and a comparison of these indicators of labour market regulations in light of their wide use in recent empirical research[1] and the controversial discussion surrounding such indicators in general,[2] the overall objective of labour law to protect employment and improve the well-being of workers as well as the potential negative externalities it may generate for the same workers that they intend to protect. The ultimate goal of our exercise is to identify the key areas for improving current data as well as refining results of empirical research based on them.

The main reason for concentrating on these three databases is that they all use the Employing Workers Indicator (EWI), a sub-indicator of the Doing Business indicators developed by the World Bank, which has been extensively reviewed and assessed as not being suitable for the inclusion into overall aggregate Doing Business indicator or for ranking countries.[3] Following important criticism from academia, civil society, and other international organizations (see notably Berg and Cazes, 2008; Lee, McCann and Torm, 2008) it underwent an independent evaluation (World Bank, 2008), an examination by a consultative group (World Bank, 2011), and a review by an independent panel (World Bank, 2013). These evaluations resulted in several significant methodological changes introduced to the EWI. Most importantly, it was determined that, although the World Bank may continue gathering raw data underlying EWI, the World Bank would suspend using the EWI to calculate the aggregate Ease of Doing Business indicator or rank countries based on it, as well as would stop referring to the EWI when formulating policy advice. According to the Final Report of the Independent Panel (ibid), "The Bank's decision to suspend the EWI acknowledged the problems inherent in measuring only the costs of labour-market regulation and not the benefits. The Panel agrees with the Bank's reasoning [World Bank, 2009] that "a comprehensive approach in advice on labour market policies is needed", and that the EWI "presents a measure of flexibility in employment regulations, but does not capture other key dimensions of employment policies, such as worker protection measures."

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[1] A very partial list of most recent works includes Freeman et al. 2008; Feldman, 2007, 2009; Bernal-Verdugo et al., 2013; Javorcik and Spatareanu, 2005.

[2] For the latest reviews, see Cazes et al.(2012), OECD (2013), and Boeri et al. (2008).

[3] For this reason, we do not review other important databases in this field, such as the OECD EPL database, or academia-lead efforts such as Deakin et al. (2007). For a comprehensive list of labour market regulations data prior to 2005, see Chataigner (2005). For the evolution of thinking related to construction of aggregate indices in the area of labour regulations, see Eichhorst et al. (2008).

Despite this, it seems that there is still a lack of adequate awareness about the debates and adopted changes, with the WB EWI series being systematically reproduced in other datasets – Fraser, WEF, and IMD – but without properly acknowledging the debate and the methodological changes in the data series. Furthermore, these databases use the EWI data to construct their own aggregate indices and to rank countries, thus disregarding significant recommendations and the decisions taken by the World Bank itself. Thus, another objective of this paper is to raise awareness among the WEF, IMD, and Fraser data users about the nature of data underlying these composite indicators.

As we proceed, we further uncover additional caveats in the three respective databases. First, we document important methodological shortcomings of WEF, IMD and Fraser indicators, such as trivial aggregation of de jure and de facto measures; the use of opinion surveys that may not represent all types of firms; and frequent methodological changes, which render data incomparable over time. These changes include adding or removing individual components from aggregate indices from one data year to another; changing methodology and definitions of these components. Some of the databases contain sample-dependent data, which should neither be aggregated with data from other sources nor used in comparative purposes over time if the sample changes – and this is not always the case. We show that the uncovered limitations and shortcomings in the three databases do not help advancing the controversial debate on the role of labour market institutions.

We also report that similarly to the initial versions of the WB EWI, labour market indicators of WEF, IMD, and Fraser contain a strong conceptual bias. They view labour institutions and regulations as a cost to business that reduces efficiency and competitiveness, and do not attempt to recognize the social objectives of labour regulations or some potential benefits to the employer. However, recent research has shown that regulations can be important in promoting job quality (Fenwick et al. 2007), encouraging investment in job training (Almeida and Aterido, 2008), discouraging absenteeism and improving workers' effort through the sense of a higher attachment to a firm (Jimeno and Toharia, 1996). Thus, there is clearly scope for improving these indicators as to incorporate broader and more comprehensive vision of labour market policies.

While previous research has already highlighted several problematic areas with the aggregate indices in the databases that we consider (Ochel and Röhn, 2006 review overall IMD, WEF, and Fraser indices prior to 2005), the wide recent use of various sub-components, and notably sub-components measuring labour market regulations for ranking countries and providing policy advice, calls for a more in-depth overview of such specific components based on the 2001-2013 period.

The rest of the paper is organized as follows. Section 2 provides a general overview of the selected indicators. Section 3 shows how the World Bank Employing Workers Indicator is systematically found among the Fraser, WEF, and IMD composite indices' ingredients. Section 4 explores how the selected indicators correlate with each other and with key outcomes of the labour markets. Section 5 further examines possible explanations for the different outlook provided by those indicators, such as the choice of variables, data sources, and aggregation techniques. Section 6 provides additional insight into the appropriate use of these data. Finally, Section 7 concludes.

2. General overview of selected databases

Table 1 presents a summary overview of the databases – and indicators – examined in this paper. The areas covered differ across the databases, ranging from survey questions on labour-employer relations and wage determination, to statistical data on female labour force participation, to de jure information on hiring and firing regulations. At the same time, significant topical overlaps can be observed. Each database under review also gives a different logic both to the collected data, and to the labour market indices based on them, though a broad name "regulations" or "institutions" may apply.

As detailed in Table 1, the sub-index produced by the WEF, the *Labor Market Efficiency (LME),* is part of the broader Global Competitiveness Index (WEF GCI) which measures and ranks competitiveness throughout the world, defined as a "the set of institutions, policies, and factors that determine the level of productivity of a country" (WEF Reports, various issues). Along with the aggregate GCI index, the *WEF LME index* is used to rank countries, and track changes in rankings over time. While some of the information pertaining to the functioning of the labour markets has been collected by WEF for over two decades,[4] it is not before 2004 that the *LME index* emerged formally as one of the twelve "pillars of productivity and competitiveness" of which GCI is comprised.[5] The overall CGI aggregation procedure is fairly complex (Box 1), but the aggregation of the LME index is straightforward and is based on an arithmetic mean. In Appendices 1.1 – 1.3, we carefully document the number of underlying components of the *LME index* (nine in the latest available report), their definitions, data sources, and evolution over time, which is particularly remarkable.

Box 1: Global Competitiveness Index, World Economic Forum: Dimensions and aggregation

The aggregation methodology behind the WEF overall index (indices) varied over the years. Starting from the 2009-10 report, a uniform aggregation methodology was applied for computing the GCI in the following three steps. First, individual *variables* that form the basis for the index are split into twelve topical areas. They are averaged within these topical areas using simple arithmetic mean to produce the values for the twelve "*pillars of competitiveness*", *Labor Market Efficiency* (LME) being one of them. Second, these pillars are aggregated into three *subindexes*, each pillar getting a fixed weight. For example, LME pillar is aggregated into the Efficiency Enhancers subindex with the weight of 17per cent. Third, the three subindexes are aggregated into the overall CGI, but with weights that vary across countries, depending on the development stage of an economy. To determine this stage, countries are sub-divided into five groups based on their GDP per capita and exports of mineral goods. Further, a maximum likelihood regression of GDP per capita is run against each subindex for past years, allowing for different coefficients for each stage of development. Finally, econometric estimates from these regressions are rounded to produce the stage-dependent weights for the three subindexes. The robustness and validity of this methodology was assessed and confirmed on numerous occasions (see, for example, WEF 2010-11 Report, Chapter 1.1). However, the fact that the outcome measure (GDP) is used as input measure (for producing weights for CGI subindexes) means that, in principle, the CGI should not further be used in regression analysis, especially when involving the assessment of its impact on development.

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[4] WEF publishes Global Competitiveness Reports since 1996.

[5] Eleven remaining pillars of Global Competitiveness Index, as of 2012-2013 report, are institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation. Box 1 overviews the GCI structure and how the LME fits in.

Table 1. Overview of selected institutional databases and indicators, labour market sub-components

Name	Area covered	Period	Countries	Nature of the data	LM index: rationale
WEF GCI World Economic Forum, Global Competitiveness Index	Labour-employer relations, wage determination flexibility, hiring and firing practices, redundancy costs, pay and productivity, management role, brain drain, female participation	2004-2013, annual; earlier data on sub-components without an index are available	Unbalanced panel: 104-144 countries	De facto, de jure, statistical data. Certain indicators are from an executive opinion survey. Redundancy costs and female participation indicators are based on EWI WB and ILO KILM respectively.	"The efficiency and flexibility of the labour market are critical for ensuring that workers are allocated to their most effective use in the economy and provided with incentives to give their best effort in their jobs. Labour markets must therefore have the flexibility to shift workers from one economic activity to another rapidly and low cost, and to allow wage fluctuations without much social disruption"
IMD World Competitiveness Yearbook	Labour regulations (minimum wages, hiring/firing practices etc), unemployment legislation, immigration laws and redundancy costs	1995-2012, annual	Unbalanced panel: 49-59 countries	De jure and de facto. Labour regulations and unemployment legislation are measured by executive opinion survey questions; redundancy costs from EWI WB	No separate labour regulations index ; these questions are used to construct a broader Business Efficiency index. Its logic: measures "extent to which the national environment encourages enterprises to perform in an innovative, profitable, and responsible manner".
Fraser EFW Frazer Institute Economic Freedom of the World Index	Minimum wage, hiring and firing regulations, centralized collective bargaining, mandated cost of hiring, mandated cost of worker dismissal, hours regulation, conscription	Systematic annual data on most of the components from 2002. Five year averages on some components for 1970-2000.	Unbalanced panel: 58-144 countries	De jure and de facto indicators coming from a range of sources, such as EWI WB, WEF, IMD, War Resisters International survey, etc.	"Many types of labour-market regulations infringe on the economic freedom of employees and employers. Among the more prominent are minimum wages, dismissal regulations, centralized wage setting, extension of union contracts to non-participating parties, and conscription. The labour-market component is designed to measure the extent to which these restraints upon economic freedom are present"
EWI WB Employing Workers', World Bank	Rigidity of employment index: difficulty of firing, rigidity of hours, redundancy rules; Redundancy cost	2006-2013, annual	184 countries	De jure, based on a hypothetical case study; an overall summary indicator is a weighted average of 3 sub indicators, with equal weights given to each; redundancy cost is reported separately	"Measures flexibility in the regulation of hiring, working hours and redundancy in a manner consistent with the ILO conventions"

Source: own reading of data reports

The IMD World Competitiveness Yearbook has been published since 1987, and until 1996 it was a joint publication with the World Economic Forum. The IMD does not have a special index governing labour area, but four individual components related to this topic - labour regulations, unemployment legislation, immigration laws, and redundancy cost - are used to construct a broader *Government Efficiency* index. Appendix 2 outlines definitions and sources of these components. Starting from 2001, the methodology behind these components, and behind the *Government Efficiency* index, unlike WEF or Fraser indices, remained relatively unchanged (Box 2). IMD ranks and analyses the capability of nations to provide a framework in which companies can compete. The IMD also reports country rankings separately for each individual component.

Finally, the *Labor Market Regulations (LMR)* index produced by the Fraser Institute ranks countries according to their labour market regulations rigidity and is part of their Economic Freedom of the World Index (EFW: Box 3). As economic "freedom" is considered to be an ultimate value, any institutional or custom regulation is viewed as reducing such freedom. The Fraser Economic Freedom of the World database has been collected since 1997, with data related to labour market regulations since 2001. Currently, the *Fraser LMR index* consists of six sub-components. Their definitions, data sources, as well as changes in the components and the methodology of data collection are reported in Appendix 3.

Box 2: IMD World Competitiveness Index: Dimensions and aggregation

IMD aggregation methodology is based on the following principles. The national environment is divided into four main *factors*: 1) Economic (domestic) Performance; 2) Government Efficiency; 3) Business Efficiency; 4) Infrastructure. Each factor is divided in 5 *sub-factors,* for a total of 20 sub-factors. These 20 sub-factors consisted of over 300 *criteria* in 2012. The information on labour markets comes under *Government Efficiency factor* and *Business Legislation sub-factor* (*Labour Regulations sub-sub-factor*), but also under *Business Efficiency factor*, *Labour Market sub-factor*. It is the *Labour Regulations sub-sub-factor* that is the most relevant to measuring labour market institutions, and also the most comparable with other databases, hence our focus is exclusively on it. In contrast, *Labour Market sub-factor* measures such issues as labour costs and remuneration, working relations, and skills. It also contains questions related to assessing brain drain (a similar component is part of the Labour Market Efficiency Index for GCI). From 2004, hard data and survey data are accorded different weights in the overall ranking. From 2003, 8 regional economies were added to 51 national economies (the regional economies were removed from 2007 onwards). In addition, ranks were split in two groups by population size (over 30 million and smaller than 30 million). From 2004, a customized ranking based on GDP level, population size and region is provided in addition to the overall ranking.

Both WEF and IMD are partly based on primary data coming from the WEF and the IMD Executive Opinion Surveys respectively, though they also contain data from other sources, such as international organizations (ILO and the World Bank). Fraser, however, is just a data repository, containing WEF and IMD questions, as well as the World Bank data and also data produced by other institutions.

> **Box 3: Fraser Economic Freedom of the World Index: Dimensions and aggregation**
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> In its latest edition of 2012, Fraser Economic Freedom of the World index is based on five topical areas: Size of Government; Legal System and Property Rights; Sound Money; Freedom to Trade Internationally; Regulation. *Labour institutions* is one of the three *subcomponents* of the Regulation area, and is based, at the lowest level of disaggregation, on 6 *components* outlined in Appendix 3.1. In total, Fraser Economic Freedom of the World index is made up of 24 *subcomponents* and 42 distinct *components*. Each sub-component and component is measured on a scale from 0 to 10, 0 reflecting most restrictive regulations, or the lack of economic freedom. These six components of *Labour institutions* are averaged (by taking a simple average) to produce a *Labour Market Regulation* index subcomponent. Likewise, simple averages are taken to produce indices of topical areas, and the overall index. Country rankings are based on these averages of sub-components, areas, and the overall index.

3. The Resilience of the World Bank employing Workers Indicator

One of the most striking features of the databases under review is that – despite their differences - they contain overlapping ingredients. Importantly, all three datasets systematically include the *World Bank Employing Workers Indicator (WB EWI)* as one of their main sources.

Table 2, column 1, shows the *WB EWI* structure. It consists of *Rigidity of employment* indicator, which is based on three sub-indicators: the difficulty of hiring index, rigidity of hours index and difficulty of redundancy index, all of which have several components in their turn. In addition, the World Bank also publishes the *Redundancy cost* indicator.

Table 2 further shows how these data have been used by other institutions in construction of their indices. It reports data starting from 2007, as this is the year when the World Bank data started being used in other datasets. Three main features can be noted.

First, there is a significant variation both across databases and over time in the type and the number of *WB EWI* components used. Both WEF and IMD initially use fully the *WB EWI* data. In 2012 however, both use only *Redundancy Costs*, most probably because starting from 2011, the WB does not report the Rigidity of Employment index anymore, but only the raw data which underlies this index. In contrast, note how Fraser uses only some, but not all, of the sub-components of the *Rigidity of Employment index*, without justification of the choice.[6] Note also that the *Nonwage labour costs* component is collected and reported by the World Bank, but has not been used for constructing indicators or country rankings – while both WEF and Fraser, in some editions, have done precisely this.

Another issue relates to the time inconsistency with which the *WB EWI* data are used in WEF and IMD databases. Whenever the year of the *WB EWI* data can be inferred from the accompanying reports, one can see that the *WB EWI* data was used without consistent updates (as in WEF reports 2009 and 2010), or with time jumps (as between

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[6] Likewise, the Global Competitiveness Report contains several opinion survey questions related to labour market efficiency, but only two were retained by Fraser Institute.

WEF reports 2011 and 2012), or with some of the components relevant for one year, and other components relevant for another year (IMD report 2011). Note that Fraser does not report which exactly *WB EWI* edition it uses. Given this, whenever countries experienced labour market institutions reforms, the timing of these reforms cannot be tracked properly in the databases using the *WB EWI*.

Last but not least, the WEF, IMD, and Fraser change the names of *WB EWI* components to adjust them to the logic of their indices. Both Fraser and IMD also systematically apply transformation formulas to these data (see Appendix 2 and 3.1).

Why anyone would care? The fact that the *EWI* data appear systematically in other databases means that the very significant decisions taken by the World Bank not to use *EWI* for aggregating it with other indicators or for ranking countries are disregarded by IMD, WEF, and Fraser. Moreover, this also means that the technical data concerns in the original source are carried over to other databases. Renaming and rescaling the ingredients by WEF, IMD, and Fraser also means that the problematic areas are more difficult to track and that potential problems accumulate. One remarkable example is the changing methodology in the EWI data in several editions of the WB reports. Especially significant changes were made in 2011 following up the WB consultative process[7] and explicitly acknowledged by the World Bank.[8] These changes also meant that there were important breaks in the data series, but they are especially difficult to track in the using databases if changes are not explicitly acknowledged.

Rather, the WEF 2012-2013 report devotes as much as a footnote acknowledging "further minor adjustments to the data" (footnote 23 on p. 44 of 545). In the IMD, there is no attention drawn to changing methodology in the *Redundancy cost* variable, IMD only adjusts the definitions from one report to the other. Neither Fraser 2012 Report attracts user's attention to the changes in the WB components, although it does report new definitions in the appendices. Notably, the definition of the Fraser *Hours regulations* component is accompanied by the following note: "This component was previously denoted "Mandated cost of hiring a worker" […] In recent years, the entire labour market area has been dropped from the Doing Business project; however, they continue to present the data in a separate section. In order to maintain as much consistency over time as possible, we have revised the dataset back to 2002 with these data replacing the previous values". The report remains silent on how this revision was effectuated: through additional data collection, extrapolation, or any other means. The World Bank Doing Business data for this component are available only from 2006 on.

While the WEF does not make any adjustment to methodological changes, the IMD states that "whenever there is a major change in methodology, all results are recalculated for the past 5 years in order to ensure a high degree of compatibility with past results". However, comparisons across reports suggest that changes in this variable were not considered as "major" in order to recalculate past values in new reports. Fraser Institute makes more efforts in this field with its chain-linked methodology in constructing the overall indices to correct for changing components and missing values for comparisons over time. However, the chain-linked index is only available for those countries that exist in the database since 2000, but not for those that were added later. In 2012 edition, the chain-index methodology is applied only to 74 out of 144 countries.

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[7] This consultative process was lead with the ILO, OECD, civil society, the private sector, labour lawyers, employer and employee representatives to review the existing methodology and to adjust it in view of the relevant ILO conventions amongst other things. See World Bank, 2011, 2013.

[8] See http://www.doingbusiness.org/data/exploretopics/employing-workers . Accessed: December 2013.

Table 2. The Resilience of the World Bank Employing Workers Indicator

Report year	WB EWI	WEF	IMD	Fraser

2007	- Rigidity of employment
	   ➤ Difficulty of hiring
	   ➤ Rigidity of hours
	   ➤ Difficulty of redundancy
	- Redundancy cost
	
	Note: varying methodology behind sub-components over time: definitions, assumptions about worker tenure, calculation of minimum wage ratio, etc.
		- Nonwage labour costs
		- Rigidity of employment
		- Firing costs
			-	- Minimum wages
				- Mandated cost of hiring
				- Mandated cost of worker dismissal

2008		- Nonwage labour costs (2007) - Rigidity of employment (2007) - Firing costs (2007)	-	- Minimum wages - Mandated cost of hiring - Mandated cost of worker dismissal
2009		- Rigidity of employment (2008) - Firing costs (2008)	- Labour market flexibility - Firing costs	- Minimum wages - Mandated cost of hiring - Mandated cost of worker dismissal
2010		- Rigidity of employment (2008) - Firing costs (2008)	- Labour market flexibility - Firing costs	- Hiring regulations and min wages - Hours regulations - Mandated cost of worker dismissal
2011		- Rigidity of employment (2009) - Redundancy cost (2009)	- Labour market flexibility (2010) - Firing costs (2011)	- Hiring regulations and min wages - Hours regulations - Mandated cost of worker dismissal
2012		- Redundancy cost (2011)	- Redundancy cost (2012)	- Hiring regulations and min wages - Hours regulations - Mandated cost of worker dismissal

Notes: Years reported in brackets refer to data years as reported in the original source, when such information is available. Example: IMD 2011 report uses the WB LM Flexibility data for the year 2010.

Minimum wages: ratio of mandated minimum wage to the average value added per worker, sub-component of Difficulty of Hiring Index

Nonwage Labour Costs/Mandated Costs of Hiring: Estimate of social security payment (retirement fund, sickness, maternity and health insurance, workplace injury, family allowance, and other obligatory contributions) and payroll taxes associated with hiring an employee in a fiscal year, expressed as a percentage of the worker's salary in that fiscal year. *This item is measured in the WB Doing Business, but not included in the calculation of rankings.*

Rigidity of Employment/Labour Market Flexibility: Rigidity of Employment Index (the average of three subindices: a Difficulty of Hiring index, a Rigidity of Hours index and Difficulty of Firing index) on a 0 (best)-to-100 scale. Higher values indicate more rigid regulation.

Firing Cost / Redundancy cost: Estimate of the cost of advance notice requirements, severance payments, and penalties due when terminating a redundant worker, expressed in weekly wages. Note changing worker profile: reference for 20 years of service are reported prior to 2012-13 report; for one, five, and ten years of service are reported in 2012-13 report.

Mandated Cost of Worker Dismissal: Based on Redundancy Cost.

Hiring Regulations and Minimum Wages: Difficulty of Hiring Index; sub-component of Rigidity of Employment index

Hours Regulations: This sub-component is based on the Rigidity of Hours Index; sub-component of Rigidity of Employment index

Given all of the above, it remains highly questionable to what extent the data in three databases can be used for comparing countries and their regulations over time. Furthermore, the World Bank no longer uses these data for ranking countries, and neither aggregates them with other Doing Business data. In contrast, this is precisely what Fraser, WEF, and IMD are doing. They provide contemporaneous country rankings and, in some instances, comparisons of how the rank positions of countries change over time, ignoring the above-mentioned debates and their constructive outcomes.

But how do the IMD, aggregate Fraser, WEF, and World Bank EWI sub-components compare between themselves?

4. How do Selected Indicators Compare?

We first examine the correlations between labour market indicators across the databases under review. In Table 3, aggregate indices are presented in bold, and selected sub-components are in italics. Data are displayed for 2009 as this year offers the most comparable data availability. We take the IMD sample as a basis for comparisons, both because it has the smallest sample and because its rankings are sample-dependent.[9]

From Table 3, both World Bank indicators - *Rigidity Index* and *Redundancy Cost* - have a relatively strong correlation with WEF and Fraser aggregate indicators that are partly based on them (the minus sign is due to the reverse scale of this indicator: higher scores indicate more rigidity). Likewise, WEF and Fraser (which also partly uses WEF) aggregate labour market indices show a correlation of 0.61. Similarly phrased WEF survey question on easiness of hiring and firing and the IMD survey questions on flexibility of labour market regulation correlate rather well (0.78). Relatively high correlations may be reassuring from the point of view of the correctness of the measurement of similar concepts across individual components. However, they also point to a certain double-counting when these individual components are averaged into aggregate indices: more weights are given to hiring and firing practices as opposed to other aspects of labour regulations. At the same time, some correlations, such as between the *WEF Flexibility* indicator and *World Bank Redundancy Cost*, or between the *WEF Hiring and Firing* component and the *World Bank Rigidity Cost* are very moderate. The latter is quite surprising, because *WEF Hiring and Firing* and the *World Bank Rigidity Cost* are supposed to measure very similar concepts, though the former measures perceptions of regulations, while the latter measures the strictness of the legal text.

Given these correlations, are countries ranked in a similar way across databases?[10] We use WEF and Fraser aggregate labour market indices together with the IMD individual question on labour market relations to list the "top 20" countries according to their competitiveness, flexibility, efficiency, or easiness of dismissal – as provided by each indicator. We also add the *Redundancy cost* calculated by the World Bank for illustrative purposes. As all datasets have different country samples, the analysis is further restricted to a comparable sample, again taking IMD and the year 2009 as a reference. On its basis, we order Fraser, WEF, and WB data to produce our own ranking of the IMD-sample countries.

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[9] See Appendix 2 for more details. Note also that the IMD does not have an aggregate indicator of labour market regulations; rather, measures of labour market regulations (including the WB components), together with other indicators, are used to produce Business framework index. In this Chapter, we focus thus only on the most relevant IMD sub-sub-components, such as *Labor Regulations*.

[10] While ranking countries according to their labour market regulations is hardly appropriate (Berg and Cazes, 2008), we reproduce them here for strictly comparative purposes – to compare the databases, and not countries themselves.

Table 3. Correlations between selected indicators, 2009

	WEF LME	WEF H&F	WEF Flex	WEF Coop	Fraser LMR	IMD LR	WB Rigidity	WB RedCost
WEF LME	1.00							
WEF and Fraser H&F	0.70	1.00						
WEF and Fraser Flex	0.41	0.57	1.00					
WEF Coop	0.78	0.46	0.12	1.00				
Fraser LMR	0.61	0.48	0.47	0.38	1.00			
IMD LR	0.75	0.78	0.41	0.66	0.52	1.00		
WB Rigidity	-0.66	-0.61	-0.39	-0.46	-0.72	-0.67	1.00	
WB RedCost	-0.47	-0.19	-0.01	-0.26	-0.62	-0.33	0.27	1.00

Notes: Correlations are based on the IMD sample of countries.

WEF LME – WEF Labor Market Efficiency Index

WEF and Fraser H&F – WEF Hiring and Firing Survey question "Hiring and firing workers is… 1=impeded by regulations, 7=flexibly determined by employers"; one of the components of WEF LME and Fraser LMR

WEF and Fraser Flex – WEF Flexibility of Wage Determination survey question, one of the components of WEF LME and of Fraser LMR

WEF Coop – WEF Cooperation in labour-employer relations survey question, one of the components of LME

Fraser LMR – Fraser Labor Market Regulations index

IMD LR – IMD Labor Relations Survey question "Labor regulations (hiring and firing practices, minimum wages etc.) … 1 = are not flexible enough, 6 = are flexible enough"

WB Rigidity – World Bank Rigidity of Employment Index

WB RedCost – World Bank Redundancy Cost

Source: own calculations.

Table 4 reflects these rank positions of IMD "top 20" countries within the four samples. Evidently, these rankings differ dramatically across databases: the IMD and the WEF give the same rank only to one country (Hong Kong), while the IMD and the World Bank give the same rank only to two countries (Denmark and Singapore). The most consistently ranked country across Fraser, WEF, and WB in the US. Apart from this, all databases give different rankings to the IMD "top 20" countries, and countries like Malaysia or Israel receive particularly different rankings across databases. Nine of the IMD "top 20" countries are not among "top 20" Fraser countries at all; five are out of the "top 20" WEF ranking, and eight do not enter the "top 20" according to the WB criteria.

Finally, we check the correlations between the selected indicators and total unemployment rates for 2009, again for comparative purposes (Figure 1).[11] While correlation does not imply causality, one can observe that stricter regulations are positively correlated with higher unemployment when using the IMD (individual component), *WEF LME* (aggregate), and *WB Rigidity of Employment Index*; but negatively when based on *Fraser LMR* (aggregate) and *WB Redundancy cost*. Note, however, that these correlations are extremely low and sometimes insignificant.

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[11] The rich empirical literature has not yet reached consensus on the effect of regulations on aggregate unemployment and other labor market outcomes. Some studies show that stricter regulations increase unemployment (Lazear, 1990; Scarpetta, 1996; Di Tella and McCulloch, 2005), while others find no significant effect on aggregate employment and unemployment (see Boeri, 2001 for a review), yet some others (Addison and Grosso, 1996) find that longer notice periods are associated with broadly favourable employment outcomes.

Given the above, the choice of one particular database and indicator seems to provide a substantially different picture of labour market regulations. Overall, this finding calls for a careful use of the different databases. It also calls for further improving existing indicators. While some similarity can partly be explained by the use of overlapping components (notably the World Bank EWI sub-components), some divergences are also partly due to the different use of the EWI ingredients. In what follows, we try to understand additional reasons behind the differences across the datasets, and highlight specific problematic areas in each of the reviewed indicators.

Table 4. Countries rankings across databases. "Top 20", 2009

IMD LR	Fraser LMR	WEF LME	WB Redundancy Cost
1. Denmark	16	5	1
2. Switzerland	5	2	11
3. Singapore	12	1	3
4. Hong Kong	1	4	9
5. Thailand	36	18	32
6. Malaysia	14	22	37
7. Kazakhstan	21	13	8
8. Japan	8	10	4
9. Canada	4	6	21
10. Turkey	51	53	40
11. Australia	7	8	3
12. Hungary	20	34	23
13. Israel	42	20	39
14. China	39	23	38
15. Finland	37	17	20
16. United Kingdom	9	7	18
17. Norway	48	12	11
18. Taiwan	46	17	38
19. United States	2	3	1
20. Austria	27	2	2

Source: Own computations, restricting Fraser, WEF, and WB to the IMD sample of countries.

5. Unpacking the indicators: Why those differences?

We examine in the next paragraphs the components included in the selected indicators, their sources, as well as the weighting schemes used to weight or aggregate these individual components to produce composite indicators.

5.1. Dimensions of composite indicators

First, it is important to recall that the different aggregate indicators do not include the same elements, which of course may explain the differences found above. For example, the *WEF LME* indicator in the most recent edition of 2012-2013 is composed of nine variables, ranging from cooperation in labour employment relations, hiring and firing practices, to taxation, brain drain, and female labour force participation (Appendix 1.3). In its turn, *Fraser LMR* in its latest edition is composed of six components. They range from hiring and firing regulations, to collective bargaining and to military conscription (Appendix 3.1). The latter has the least apparent relevance to the degree of Labour Market Regulations but is included on the justification that use of conscription infringes on the economic freedom of the employers and employers, though no further empirical or theoretical justification is provided.

This points to the importance of the selection of the dimensions to be chosen for the development of an indicator. Indeed, the pertinence, quality and reliability of any given indicator heavily depend on the choice of the underlying components: it should be based on a solid theoretical framework for both selection and combination of single components into a meaningful composite index; and individual components should in turn be selected on the principles of analytical soundness, comprehensiveness, pertinence to the measured phenomenon, and also relationship with other individual components (OECD, 2008). The review of Appendices 1.1-3.1 which provide the full list, description, and changes over time of the components for selected databases suggests that these principles are not necessarily systematically fulfilled.

Generally, all three datasets include different – though sometimes overlapping – ingredients, without any apparent justification of how and why these specific variables are chosen. Arguably, the chosen components do not cover the topic of labour market efficiency, regulations or institutions exhaustively, leaving aside other important aspects such as worker protection, safety and health, social security provisions, labour administration. At the same time, there is a significant repetitiveness of questions within the same indicators, which is especially pronounced in the case of Fraser: hiring and firing regulations in the latest available editions are measured in various ways by three out of six variables that make part of the aggregate LMR index (Appendix 3.1: *Hiring regulations and minimum wages*, and *Mandated cost of worker dismissal* based on the WB EWI, as well as *Hiring and firing* question from the WEF). The lack of the theoretical background or sound analytical approach for the choice of specific components compromises the indicators' comprehensiveness. Repetitiveness of questions, in its turn, means that certain included concepts are double-counted, and that the aggregated indicators are biased in the direction of these over-represented concepts.

All three databases contain sub-components based on opinion surveys. Such questions can only be valuable when they are properly phrased, and contain clear and exhaustive concepts. However, in some instances, the overall phrasing of the questions does not seem fortunate. For example, the IMD *Labor relations question* is phrased as follows: "Labor regulations (hiring and firing practices, minimum wages etc.) … 1 = are not flexible enough, 6 = are flexible enough". The questions seems to cover too many issues which may be contradictory: some countries may have flexible firing and hiring

practices but inflexible minimum wages, either in their level, setting, or degree of formality. It is thus not clear what aspect of labour regulations the response actually reflects. Another example is the WEF *Flexibility of Wage Determination* question, which concerns the degree of centralization of the wage setting. It ignores, however, the coordination of wage bargaining, and no supplementary question exists to measure it (Ochel and Rohn, 2006).

Finally, there is also a significant variation of components not only *across*, but also *within* the indicators, both in terms of their number, type, or changing definition of the same component over time. These changes are especially apparent in the case of WEF and Fraser. Since its first appearance in the 2004-2005 report, the WEF LME indicator underwent six changes in the number and types of included components (Appendices 1.1-1.3). Since 2001, the Fraser LMR index underwent four changes in the number and types of included components, and also numerous additional changes in the definitions and data sources of these components (Appendix 3.1). As both WEF and Fraser use secondary sources to collect data, a regular change in the sub-components creates a feeling that there is a "shopping for questions" driven by concerns such as data availability from other sources, rather than by theoretical underpinning or empirical relevance. These regular changes also compromise the use of these data for time-series analysis. We address this issue in more detail in section 5.

5.2. Shortcomings linked to certain data sources

The sources of the underlying data play a critical role in determining the appropriateness of any given indicator. Beyond the systematic inclusion of the WB EWI, two further issues can be highlighted: the use of opinion surveys, and the use of different data sources for the same variable.

Indeed, one of the common features of the reviewed datasets is their use of opinion surveys as one of the main source of information. Both WEF and IMD (and hence Fraser as a repository) are using their own Executive Opinion Surveys to collect data on labour market rigidities and on other relevant aspects of labour markets. As suggested by their name, respondents are business executives ranging from top- to middle-management, and the reported answers hence reflect only the employers' viewpoint on labour relations, and sometimes with the priors reflecting other countries' experiences. Chor and Freeman (2005) contrasted the WEF/Fraser responses with the responses of union officials, activists, and professors of labour law and industrial relations, to actually find a strong similarity of the viewpoints on de facto labour practises across these different groups of stakeholders.

However, sampling modalities and respondents selection are different between WEF and the IMD, which may lead to the differences found above. For example, WEF is carrying out a randomized sampling which accounts for the sector and firm size distribution of economies. Unlike WEF, the choice of firms participating to the IMD survey accounts only for the industries or sectors, but does not seem to account for the size of the enterprise. This is rather critical for assessing the regulations, as both provisions and their enforcement may vary across firms of different size. Collective bargaining outcomes also differ tremendously along this dimension: they may have significant consequences in sizable firms but be virtually inexistent in small firms. These differences may severely affect the way business executives perceive overall labour regulations in a country, not just in their firm. Furthermore, the IMD survey is conducted with "nationals or expatriates, located in local and foreign enterprises in the country and which, in general, have an international dimension … We try to contact most IMD

alumni" (IMD, 2012).[12] While for some of the questions measuring economic performance such respondents may provide valuable insights, for questions of labour market regulations they may not be the most suitable group. This is because firms with an international exposure usually have labour practices different from the rest of the economy; they cover mostly formal sector; and the business executives of such companies – especially non-nationals - may have their own priors as to functioning of labour markets.

Of note is also the fact that in countries where a large portion of disputes are solved in courts or with mediation, decisions ruling in favour of workers may be pro-cyclical (Bertola et al., 2000; Ichino et al., 2003). This means that the reported perceptions of strictness of regulations may reflect these decisions, and hence the economic conjuncture, rather than the factual strictness of regulations. The latter is particularly important if the data are further used in the regression analysis of economic conjuncture: simultaneity and reverse causality will likely to be an issue.

Another problematic area with some of the databases, and especially with Fraser, is the use of different data sources for the same variable. This is done in order to provide considerable time coverage to some of the LM components. Thus, Fraser unemployment insurance component at some point was based on data from two different surveys, IMD and WEF. However, as shown in Appendix 2, IMD reports to users converted, rather than actual survey data, where the converted values for each country are sample-dependent. That is, even if WEF and IMD have similarly phrased question on unemployment legislation, WEF reports survey responses that are independent of the responses provided in other countries of the sample, while IMD reports converted scores that are dependent on the responses provided in other countries of the sample.[13] Thus, IMD cannot be used as a complementary source of data. Furthermore, it cannot be aggregated with any other data covering out-of-the-IMD sample countries, because the IMD data values are sample-dependent.

5.3. The choice of aggregation schemes

There are (at least) three options to aggregate the different dimensions and create a synthetic indicator: use weights based on theoretical assumptions; give equal weights to each dimension; or define weights according to their statistical significance. The choice of a particular weighting scheme may give rise to substantial differences between indicators. Some similarities and differences in aggregation techniques across the reviewed databases can be highlighted.

While weighting according to an underlying theoretical framework would be an ideal and robust choice, it is often easier and a priori legitimate to give equal weights to all dimensions.[14] This is the choice made by WEF and Fraser that simply average the data, while the IMD gives higher weights to hard data as compared to survey data.

A related issue is then the type of data that is aggregated into an index. WEF, IMD, and Fraser all aggregate "de facto" data, such as survey questions on the flexibility of regulations, with "de jure" information, such as weeks of advance notice and severance pay, also adding aggregated indices of the World Bank, and, in some instances, "hard" statistical data. This different nature of the aggregated variables, and the way they are

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[12] IMD is a Swiss business school offering various business programs.

[13] Fraser used the converted IMD values.

[14] WEF undertakes regression analysis to assign data-driven weights to different components of its overall GCI index, but does not apply a similar procedure for constructing its Labour Market Efficiency index.

grouped together, raises concerns. Simply averaging different types of data does not allow to account for possible endogeneity between these types of information, and neither for the fact that some of the variables reflect outcomes (outputs) of the underlying processes measured by other variables (inputs) with which they are averaged. This is the case of WEF *LME*, for example, which imbeds *female-to-male employment rates* and information on *the difficulty of hiring and firing*. The more there are different types of data included into an index, and the less endogeneity of the components is taken into account, the more different the resulting indices are. In addition, aggregating the "outcomes" data with measures of institutions or perceptions is problematic if a composite indicator is further used to analyse the outcomes. This partly explains why different indices correlated differently with unemployment measures.

Further problem with simple averages is that, in the case of overlapping or repeating information in subcomponents, an aggregate index is biased towards that dimension (Ochel and Rohn, 2006). This latter concern is especially high in the case of Fraser *LMR* index, which contains questions measuring similar phenomena (three out of six, in the case of Fraser: see Appendix 3.1). A high correlation between some of these questions reported in Table 2 suggests that there is a considerable double-counting when these individual components are averaged into aggregate indices: more weights are given to hiring and firing practices as opposed to other aspects of labour regulations. Despite this evidence, authors of Fraser reports claim that such simple averaging of six components is the most objective way to reflect the unknown weights that may also be interdependent.

6. Few additional highlights for an appropriate use of data

Despite the outlined problematic areas with the datasets under review, it is still possible to use them for some specific analysis and needs – provided the usage is based on a clear understanding of what can, and cannot, be done with the data. For example, cross-country comparisons within the same year, and based on disaggregated components, can in many instances provide interesting insights on phenomena measured by these components. Other types of data use, such as examining changes in rankings over time, or time-series analysis based on reviewed composites indicators, may be more problematic. In this section, we overview further flaws that should be bore in mind when deciding on how to use labour market data of the three databases.

6.1. Global competitiveness index, World Economic Forum

Perhaps the most critical issue with the WEF data is that both the overall *GCI* and the specific *LME* index are further used to track changes in country rankings from one year to another - without taking into account the almost annual changes in the methodology (components). That is, each WEF annual report provides annual changes in the *GCI*, as well as changes in the country rankings based on it, showing the "progress" of countries towards competitiveness, or away from it. However, it is impossible to judge whether countries move in the rankings because of the genuine changes *in* the underlying components or because of the changes *of* the components.

The issue can be illustrated using two latest available reports, which witnessed changes in two *LME* components (Appendix 1.3): the *Rigidity of Employment* component is used in 2011-2012 but not in 2012-13 report, and the definition of *Redundancy Costs* was modified. It is also helpful to find a country which, say, has an increase in the *LME* score, but a decrease or no change on all those individual components making part of the

index that remain the same between the two reports. Such is the case of France, for instance (Table 5). It experienced an upward change in the aggregate *LME* index (Table 5, column 1). However, it experienced a downward change in seven out of ten individual components constituting *LME* in 2011 (columns 2-8). The change in the eighth component, *Female Labour Force Participation* (column 9), is too small to imply significant changes in the indicator. Dropping the ninth component, *Rigidity of Employment* component (column 11) between the two reports necessarily drives the index further down. With the jump from 32 to 12 weeks, *Redundancy Cost* (column 10) is the only component responsible for the reported upward change in the *LME* index.[15] This change happened exclusively because of the change in the component definition, no actual change in the redundancy cost in France took place in that year. The change in this component is sufficiently large to offset both the opposite-direction changes on other components, and the opposite-direction change of the index due to dropping *Rigidity of Employment.*

All in all, because with each change in the methodology the data are not revised backwards, neither *LME*, nor *GCI*, nor country rankings based on these indices, are suitable for comparisons over time.

Table 5. Evolution of the LME and its underlying components. Example of France

	LME	Co-operation	Flexi-bility	Hiring and Firing	Tax	Pay and Prod	Manage ment	Brain Drain	Female LFP	Redun dancy	Rigidity of employ-ment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2012	4.41	3.3	5.1	2.5	2.8	3.9	5.0	3.7	0.88	12	.
2011	4.38	3.4	5.2	2.7	2.8	4.1	5.1	4	0.87	32	52

Note:
- For components in columns 9, 10, and 11, hard data are reported.
- For rigidity of employment, only hard data are reported by WEF. According to our computation, the min-max converted score is 5.5 in 2011.

Source: WEF Reports, 2011, 2012.

6.2. World competitiveness index, IMD

One of the most critical issues with the index is that the IMD does not report the actual data, such as averages of responses to each question by country. Instead, it uses a special transformation formula – a standard deviation method – which measures the relative difference between economies' performances. That is, for each variable, the average value for the entire population of economies sampled in that year is computed, as well as the standard deviation of each country; then a standardized value is calculated by subtracting the average value from the economy's original value and dividing the result by the standard deviation. It is this standardized value for each economy that is reported.

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[15] For redundancy cost, only hard data are reported by WEF. It indicates the downward movement in the number of weeks for France. However, since this is the move "towards flexibility", in the computation of the LME index, these data are adjusted to the 1-7 scale with 7 meaning "more flexible outcomes". Thus, a higher value is given to this component in 2012 as compared to 2011. Our computations using the min-max conversion formula provided in the report and the full sample of countries suggests that the scores are 2.2 in 2012 and 1.88 in 2011.

This method is useful to produce the IMD rankings, both individual criteria and aggregate ones within the same year. However, this method does not allow comparing country rankings over time – simply because the number of countries changes from one survey to another (Appendix 2). Each year's ranking is dependent on the values of the countries in that particular sample, and does not have an out-of-the-sample value. Furthermore, and for the same reason, rescaled IMD values are not suitable for comparisons with non-rescaled non-IMD data. They are, however, used by Fraser to be averaged with other non-rescaled variables in producing their aggregate indices.

6.3. Economic freedom of the world, Fraser Institute

As Fraser does not collect or produce its own data, but uses data from external sources, such as WEF, IMD in its previous editions, and the World Bank Employing Workers data, all of the above-mentioned critiques of these data sources (and especially the caveats of their use for time-series analysis) apply to Fraser. In addition to this, Fraser index has one further serious shortcoming that make it less than ideal for assessing the evolution of labour market regulations. It relates to the fact that the index is computed as a simple ad hoc average of components according to data availability. Clearly, some of the overall results are thus driven by data availability and by the values of available components. This is especially aggravated by the fact that one of the components – conscription - is remarkable for its discrete values (it takes only values such as 1, 3, 5, and 10, on a scale from 0 to 10), and for jumps in values (such as from 3 to 10 from one year to another).

The implications for *cross-country* comparisons of both averaging of available components and of including a technically different variable "conscriptions" are illustrated in Table 6. This Table compares Azerbaijan and Barbados in 2010. Barbados has significantly lower values of "Hiring and firing regulations" and of "Centralized collective bargaining" as compared to Azerbaijan. The data on three other components relevant for understanding labour markets in Barbados are missing. It is the particularly high value of the "conscription" variable that fully drives the overall result and gives the same overall *Labor Market Regulation* score to both countries – in a very misleading way. In total, we were able to count that, out of 143 countries in Fraser sample with available data on 2010, 16 have missing data on at least one sub-component, while aggregate index is reported for all of them. Out of 121 countries with data on 2003, 25 have missing data on at least one of the sub-components, while the aggregate index is reported for all of them.

As mentioned earlier, the authors of Fraser reports use a correcting methodology (chain-linked index) in constructing the overall indices to account for changing components and missing values for *comparisons over time*. Also, revisions backwards are effectuated. However, they are sometimes effectuated only partially. In such setting, knowing the historical evolution of components reported in Appendix 3.1 may be of help even for those users who use only the latest editions of the data revised backwards.

This issue is illustrated in Appendix 3.2. It records *the way* the data were reported in accompanying databases varied – not just the data themselves, and uses Argentina as an example of data values. In 2010, new components were introduced by Fraser. Based on them, the database was revised back to 2002, with new components replacing the old ones. However, prior to 2002, data on old components are still reported in the 2010 and in 2012 editions of the Fraser database. This is the case for the same topical components, such as *Impact of minimum wage* component, which was based on a WEF GCR survey question in 2001, and which became *Hiring regulations and minimum wage* of the WB DB after 2001; or for the *Centralized collective wage bargaining* component, which prior

to 2002 reflected the *Share of labour force whose wages set by centralized collective bargaining*. It is also the case for discontinuous series, such as *Unemployment insurance*, which was replaced by another series, *Hours Regulations*, from 2002 on. In other words, the new components replaced the old components, but the actual reported data series behind the new names reflect old components prior to 2002, and new components after 2002 (see shaded cells in Appendix 3.2). Despite Fraser disclaimer, this confounding of data series creates artefacts and may lead to wrong interpretations, notably in identifying 2002 as a year of important reforms, which was not the case (see for example Bernal-Verdugo et al., 2013).[16]

Table 6. Fraser 2012 report, data for 2010: Comparing selected countries

Countries	5Bi Hiring regulations and minimum wage	5Bii Hiring and firing regulations	5Biii Centralized collective bargaining	5Biv Hours Regulations	5Bv Mandated cost of worker dismissal	5Bvi Conscription	5B Labour market regulations
Azerbaijan	8.3	7.2	7.8	8.0	8.8	1	6.9
Barbados	.	4.8	5.9	.	.	10	6.9

Source: Fraser Database, 2012.

7. Conclusions

This paper reviewed three influential databases and indicators measuring labour market regulations and their evolution across the world. It illustrated that these databases display a different picture of labour market regulations. It also uncovered several limitations and shortcomings in all three databases. Our findings suggest that policy advice on the role of labour market regulations should be done with great caution, especially when based on empirical evidence heavily dependent on the choice of data and indicators. In fact, the review undertaken in this paper suggests that none of these indicators can be claimed as sufficiently precise or sufficiently sound for basing coherent policy advice.

Our findings do not imply that indicators measuring the extent of regulations, or strength of institutions, should not be produced. Rather, they suggest that such indicators should be based on more balanced conceptual frameworks and robust methodological choices. This paper also showed that there is room for improving existing indicators. Already a decade ago, Bertola et al. (2000) urged that further research to find reliable means of capturing the complexity of the theoretical and empirical issues involved in creating employment protection indicators be undertaken. Perhaps more than ever before, there is a great need for creating transparent, integral, and comprehensive indicators that would provide a more solid basis for policy advice. There is also a need to raise further awareness about the debates underlying the indicators, what methodological changes these debates imply, and how different these changes are from genuine reforms reflected in the data.

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[16] These authors use the Fraser 2010 data edition, and on its basis, associate significant changes in the data with reforms processes. The authors kindly provided us with the list of reforms that they identified in the period from 2000 to 2008. Out of 52 identified episodes of reforms, 30 occurred in 2002.

References

Addison, J.; Grosso, J.-L. 1996. "Job security provisions and employment: Revised estimates," *Industrial Relations*, Vol. 35 (4), pp. 585–603.

Alesina, A.; Algan, Y.; Cahuc, P.; Giuliano, P. 2013. Family Values and the Regulation of Labour, NBER Working Paper 15747.

Almeida, R.K.; Aterido, R. 2008. *The incentives to invest in job training: Do strict labor codes influence this decision?* World Bank, Social Protection Discussion Papers 46189.

Berg, J.; Cazes, S. 2008. "Policymaking gone awry: The labor market regulations of the doing business indicators," *Comparative Labor Law & Policy Journal*, Vol. 29, Issue 4, pp. 349–382.

Bernal-Verdugo, L. ; Furceri D. ; Guillaume, D. 2013. "Banking crises, labor reforms, and unemployment," *Journal of Comparative Economics*, https://dx.doi.org/10.1016/j.jce.2013.03.001.

Bertola, G.; Boeri, T.; Cazes, S. 2000. "Employment protection in industrialized countries: The case for new indicators," *International Labour Review*, 139 (1).

Boeri, T. 2011. "Institutional reforms and dualism in European labor markets" in O.Ashenfelter and D.Card (eds.): *Handbook of labor economics*, Vol. 4b, North Holland, Amsterdam.

--------; Helppie, B.; Macis, M. 2008. *Labor regulations in developing countries: A review of the evidence and directions for future research*, World Bank Social Protection Discussion Paper 0833.

Cazes, S.; Khatiwada, S.; Malo, M. 2012. *Employment protection and collective bargaining: Beyond the deregulation agenda*, ILO Employment Working Paper No. 133.

Chataignier, A. 2005. *Statistical indicators relating to social dialogue: A compilation of multiple country databases*, ILO WP 56.

Chor, D.; Freeman, R. 2005. *The 2004 Global Labor Survey: Workplace institutions and practices around the world*, NBER WP 11598.

Deakin, S.; Lele, P.; Siems, M. 2007. "The evolution of labour law: Calibrating and comparing regulatory regimes," *International Labour Review*, Vol. 156, pp. 133-62.

Di Tella, R. ; MacCulloch, R. 2005. "The consequences of labour market flexibility : Panel evidence based on survey data," *European Economic Review*, Vol. 49, pp.1225-1259.

Djankov, S.; Ramalho, R. 2009. "Employment laws in developing countries," *Journal of Comparative Economics*, 37(1), 3-13.

D'Orlando, F.; Ferrante, F.; Ruiu, G. 2011. Culturally Based Beliefs and Labor Market Institutions. *The Journal of Socio-Economics*, 40(2), pp. 150-162.

Eichhorst, W.; Feil, M.; Braun, CH. 2008. *What have we learned? Assessing labor market institutions and indicators*. IZA Discussion Paper 3470.

Feldman, H. 2007. "The quality of industrial relations and unemployment around the world," *Economic Letters*, 99(2008), pp. 200-203.

--------. 2009. "The unemployment effects of labor regulation around the world," *Journal of Comparative Economics*, 37(1), pp. 76–90.

Fenwick, C.; Howe, J.; Marshall, S.; Landau, I. 2007. *Labour and labour-related laws in micro and small enterprises: Innovative regulatory approaches*, SEED Working Paper 81, Small enterprise programme, ILO, Geneva.

Fraser Institute. 2013. *Economic freedom of the world: 2013 Annual report*, Vancouver. (All issues between 2001 and 2013).

Freeman, R.B.; Kruse, D.; Blazi, J. 2008. "The same yet different: Worker reports on labour practices and outcomes in a single firm across countries," *Labour Economics*, 15(4), pp. 749-770.

Javorcik, B.; Spatareanu, M. 2005. "Do foreign investors care about labor market regulations?" *Review of World Economics,* 141(3), pp. 375-403.

Jimeno, J.F.; Toharia, L. 1996. "Effort, absenteeism, and fixed term employment contracts," *Revista Española de Economía*, 13, pp. 105-119.

Ichino, A.; Polo, M.; Rettore, E. 2003. "Are judges biased by labor market conditions?" *European Economic Review*, 47 (5), pp. 913-944.

International Institute for Management Development (IMD). 2013. *World Competitiveness Yearbook 2013*, Lausanne. (All issues between 2001 and 2013).

Lazear, E. 1990. "Job security provisions and unemployment," *Quarterly Journal of Economics*, Vol. 105, pp. 699-726.

Lee, S.; McCann, D.; Torm, N. 2008. "The World Bank's "Employing workers" index: Findings and critiques – A review of recent evidence," *International Labour Review*, 147 (4), pp.416–432.

Nickell, S.; Layard, R. 1999. "Labour Market Institutions and Economic Performance," *Handbook of Labour Economics*, 3(C), pp. 3029-3084.

Ochel, W.; Röhn, O. 2006. Ranking of Countries - The WEF, IMD, Fraser and Heritage Indices. *CESifo DICE Report*, *Ifo Institute for Economic Research at the University of Munich*, Vol. 4(2), pages 48-60.

OECD. 1999. *Employment Outlook*, Paris.

--------. 2008. *Handbook on constructing composite indicators. Methodology and user guide*, Paris.

--------. 2013. "Protecting Jobs, Enhancing Flexibility: A New Look at Employment Protection Legislation," in *OECD Employment Outlook 2013*, OECD Publishing.

--------. 2014. *Strictness of employment protection database.* Available at: http://www.oecd.org/els/emp/onlineoecdemploymentdatabase.htm, accessed: January.

Scarpetta, S. 1996. "Assessing the role of labour market policies and institutional settings on unemployment: A cross-country study," *OECD Economic Studies*, No. 26.

Schwab, K.; Porter, M. 2013. *The Global Competitiveness Report 2012-2013*, World Economic Forum, Geneva. (All issues between 2001 and 2013).

World Bank. 2008. *Doing Business: An independent evaluation report. Taking the measure of the World Bank-IFC Doing Business Indicators*. Available at: http://web.worldbank.org/WBSITE/EXTERNAL/EXTOED/EXTDOIBUS/0,,contentMDK:21645387~pagePK:64829573~piPK:64829550~theSitePK:4663967,00.html . Accessed: November 2013.

--------. 2009. *Guidance note for World Bank group staff on the use of the Doing Business Employing Workers Indicator for policy advice*. Available at: http://www.doingbusiness.org/methodology/~/media/fpdkm/doing%20business/documents/methodology/ewi/ewi-guidance-note.pdf , accessed: January, 2014.

--------. 2011. *Doing Business Employing Workers Consultative Group: Final report*. Available at: http://www.doingbusiness.org/data/exploretopics/employing-workers. Accessed: November, 2013.

--------. 2013. *Independent Panel Review of the Doing Business Report*. Available at: http://www.dbrpanel.org/ . Accessed: January, 2014.

Figure 1. Correlations between selected labour market indicators and total unemployment rate, 2009
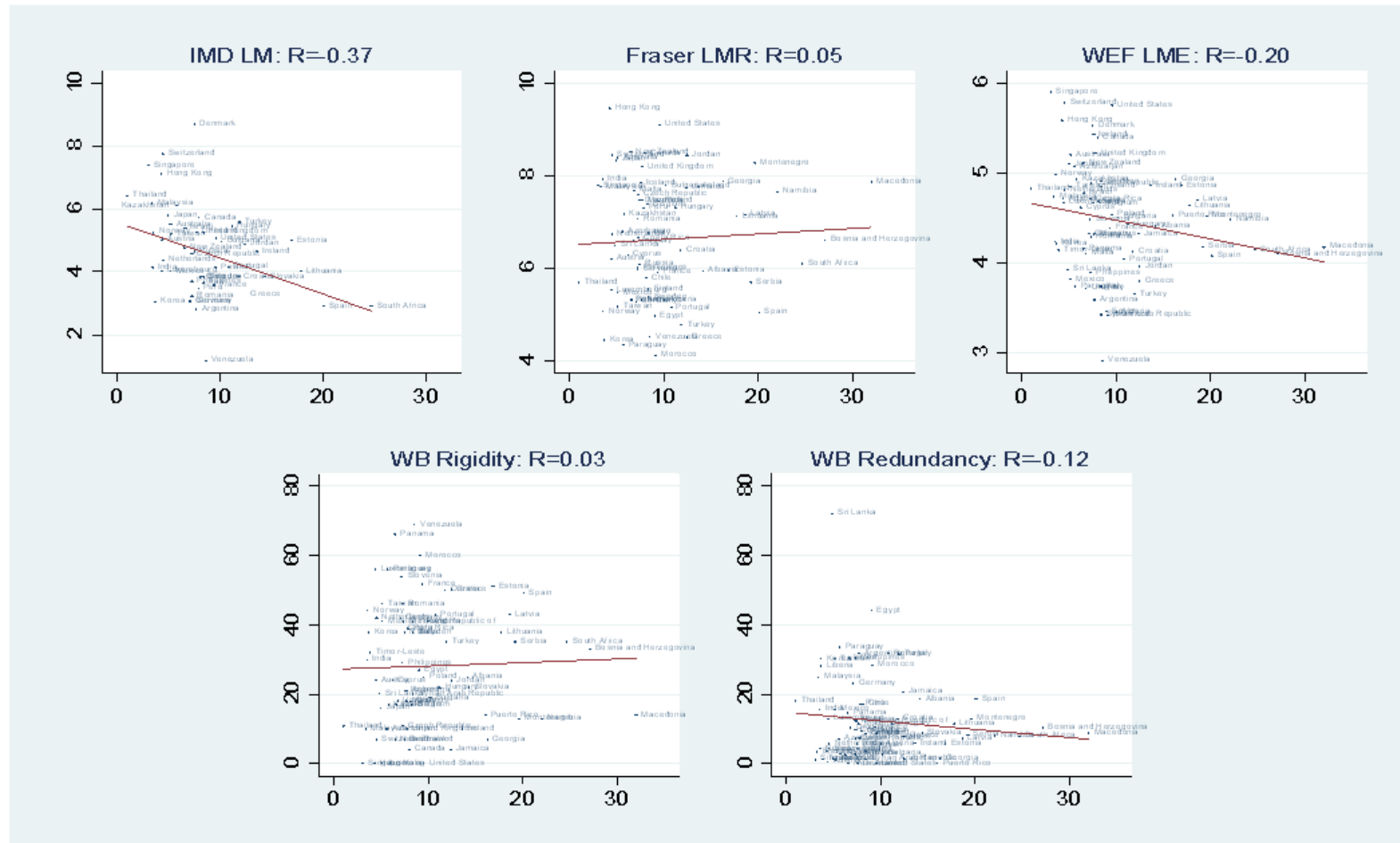
Note: IMD, Fraser, WEF: higher values indicate more competitiveness, freedom, or efficiency. WB: higher values indicate more strictness and rigidity.
Source: Own computations based on selected databases and the ILO KILM.

Appendix 1.1 Global competitiveness report labour market indicators and changes over time (2001-2004)

Report Year	2001-02	2002-03	2003-04
Number of Countries	75	80	102
LM Indicators*	1. Technological Innovation and Diffusion • (3.12) Brain Drain 2. Public Institutions • (4.13) Minimum Wage Enforcement 3. Company Operations and Strategy • (10.15) Reliance on Professional Management • (10.19) Hiring and Firing Practices • (10.21) Cooperation in Labour-Employer Relations • (10.23) Pay and Productivity	1. Technological Innovation and Diffusion • (3.12) Brain Drain 2. Company Operations and Strategy • (10.15) Reliance on Professional Management • (10.18) Hiring and Firing Practices • (10.19) Flexibility of Wage Determination • (10.20) Cooperation in Labour-Employer Relations • (10.21) Pay and Productivity	1. Human Resources: Education, Health and Labour • (4.09) Brain Drain 2. Company Operations and Strategy • (10.15) Reliance on Professional Management • (10.18) Hiring and Firing Practices • (10.19) Flexibility of Wage Determination • (10.20) Cooperation in Labour-Employer Relations • (10.21) Pay and Productivity

Notes:

- Prior to 2004-05 the Global Competitiveness Report did not calculate the composite Labor Market Efficiency Indicator/Pillar. Instead, labour market indicators were reported individually under various sections, as presented here.
- Numbers in brackets next to components' names reflect the structure of the GCI index and match the numbering of the GCI data tables. The number preceding the period indicates to which pillar the variable belongs.

Source: Adopted from Schwab and Porter, various issues.

Appendix 1.2 Global competitiveness Report labour market pillar and changes over time (2004-2008)

Report Year	2004-05	2005-06, 2006-2007	2007-08, 2008-2009
Number of Countries	104	117, 125	131, 134
LM Efficiency	7th pillar (pilot version) 1. Flexibility • (6.13) Extent and Effect of Taxation (weight = ½) • (9.18) Hiring and Firing practices • (9.19) Flexibility of wage determination • (9.20) Cooperation in labour-employer relations 2. Female Participation • (4.13) Maternity laws' impact on hiring women • (7.08) Private sector employment for women 3. Meritocracy (incentives/effort) • (4.12) Brain drain • (9.15) Reliance on professional management (weight = ½) • (9.21) Pay and productivity	6th pillar- LM Flexibility and Efficiency (part of Market Efficiency) 1. Flexibility • (8.17; 6.12) Hiring and Firing Practices • (8.18; 6.13) Flexibility of Wage Determination • (8.19; 6.14) Cooperation in labour/employer relations 2. Efficiency • (8.14; 6.15) Reliance on Professional Management • (8.20; 6.16) Pay and Productivity • (4.08; 6.17) Brain Drain • (4.09; 6.18) Private Sector Employment of Women	7th pillar 1. Flexibility- 50% • (7.01) Cooperation in labour employer relations • (7.02) Flexibility of wage determination • (7.03) Nonwage labour costs • (7.04) Rigidity of employment • (7.05) Hiring and firing practices • (6.04) Extent and effect of taxation (weight = ½) • (6.05) Total tax rate (weight = ½) • (7.06) Firing Costs 2. Efficient use of talent- 50% • (7.07) Pay and productivity • (7.08) Reliance on professional management (weight = ½) • (7.09) Brain Drain • (7.10) Female participation in labour force

Notes:

- To compute LME index, an arithmetic mean is used to aggregate individual variables within a category
- Indicators that are followed by weight = ½ enter into the GCI index through two pillars. To prevent double-counting, they are assigned half-weights.

Appendix 1.3 Global competitiveness report Labour market pillar and changes over time (2008-2013)

Report Year	2009-10	2010-11, 2011-2012	2012-13
Number of Countries	133	139, 142	144
LM Efficiency	7th pillar	7th pillar	7th pillar

<table>
<tr><td>

1.Flexibility- 50%
- (7.01) Cooperation in labour employer relations
- (7.02) Flexibility of wage determination
- (7.03) Rigidity of employment
- (7.04) Hiring and firing practices
- (6.04) Extent and effect of taxation (weight = ½)
- (6.05) Total tax rate (weight = ½)
- (7.05) Firing Costs

</td><td>

1.Flexibility- 50%
- (7.01) Cooperation in labour employer relations
- (7.02) Flexibility of wage determination
- (7.03) Rigidity of Employment
- (7.04) Hiring and firing practices
- (7.05) Redundancy Cost
- (6.04) Extent and effect of taxation (weight = ½)

</td><td>

1.Flexibility- 50%
- (7.01) Cooperation in labour employer relations
- (7.02) Flexibility of wage determination
- (7.03) Hiring and firing practices
- (7.04) Redundancy Cost
- (6.04) Extent and effect of taxation (weight = ½)

</td></tr>
<tr><td>

2.Efficient use of talent- 50%
- (7.06) Pay and productivity
- (7.07) Reliance on professional management (weight = ½)
- (7.08) Brain Drain
- (7.09) Female participation in labour force

</td><td>

2.Efficient use of talent- 50%
- (7.06) Pay and productivity
- (7.07) Reliance on professional management (weight = ½)
- (7.08) Brain Drain
- (7.09) Female participation in labour force

</td><td>

2.Efficient use of talent- 50%
- (7.05) Pay and productivity
- (7.06) Reliance on professional management (weight = ½)
- (7.07) Brain Drain
- (7.08) Female participation in labour force

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Variables definitions (2001-02 to 2003-04 reports)

Brain Drain: Survey question: "Scientists and Engineers in your country… 1=normally leave to pursue opportunities elsewhere, 7=almost always remain in the country."

Minimum wages: Survey question: "The minimum wage set by law in your country is…1=never enforced, 7=strongly enforced."

Reliance on Professional Management: Survey question: "Senior management positions in your country… 1=are often held by relatives, 7=go only to skilled professionals."

Hiring and Firing Practices: Survey question: "Hiring and firing workers is… 1=impeded by regulations, 7=flexibly determined by employers."

Pay and Productivity: Survey Question: "Pay in your country is… 1=not related to worker productivity, 7=strongly related to worker productivity."

Definitions and sources of additional variables, from 2004-05 report onwards

Flexibility of Wage Determination: Survey Question: "Wages in your country are… 1 = set by a centralized bargaining process, 7 = up to each individual company"

Cooperation in Labour-Employer Relations: Survey Question: "Labour-employer relations in your country are... 1=generally confrontational, 7=generally cooperative".

Extent and Effect of Taxation: Survey Question: "The level of taxes in your country… 1=significantly limits incentive to work or invest, 7=has little impact on incentives to work or invest.

Maternity laws' impact on hiring women: Survey Question: "In your country, maternity laws… 1=impede the hiring of women, 7=are not a hindrance for hiring women."

Private sector employment of women: Survey Question: "In your country, private sector employment of women is … 1=limited and usually takes place in less important jobs, 7=is equal to that of men."

Nonwage labour costs: Estimate of social security payment (retirement fund, sickness, maternity and health insurance, workplace injury, family allowance, and other obligatory contributions) and payroll taxes associated with hiring an employee in a fiscal year, expressed as a percentage of the worker's salary in that fiscal year. Source: The World Bank, Doing Business.

Rigidity of Employment: Rigidity of Employment Index on a 0 (best)-to-100 scale. Source: The World Bank, Doing Business.

Total Tax rate: This variable is a combination of profit tax (per cent of profits), labour tax and contributions (per cent of profits), and other taxes (per cent of profits). Source: The World Bank, Doing Business.

Female Participation in Labour Force: Percentage of women aged 14–65 participating in the labour force divided by the percentage of men aged 14–65 participating in the labour force. The indicator uses a 15-64 age group from GCR's 2010-11 report onwards. Sources: International Labour Organization, Key Indicators of the Labour Markets Net (4th edition, 2005); national sources.

Redundancy cost: Estimate of the cost of advance notice requirements, severance payments, and penalties due when terminating a redundant worker, expressed in weekly wages. Sources: The World Bank, Doing Business. The indicator was referred to as **Firing Costs** till WEF's 2009-10 report. Note changing worker profile: reference for 20 years of service are reported prior to 2012-13 report; for one, five, and ten years of service are reported in 2012-13 report.

Hard data are reported as they are. However, in calculating the LME index, it is converted into the 1-7 scale using the following formula:

$$6 \times (\text{country value - sample minimum})/ (\text{sample maximum-sample minimum}) + 1$$

The sample minimum and sample maximum are the lowest and highest values of the overall sample, respectively. In some cases, adjustments were made to account for extreme outliers in the data.

Appendix 2. IMD components and their changes over time

Year of the Report	2001-2008	2009-2011	2012
Number of Countries	49-55	57-59	59

LM Indicators	Govt. Efficiency Factor
	➢ Business Framework/Legislation Sub-factor
	  o Sub-sub-factors:
	
	(2.4.11) Labour Regulations
	(2.4.12) Unemployment Legislation
	(2.4.13) Immigration Laws
		Govt. Efficiency Factor
		➢ Business Legislation Sub-factor
		  o Sub-sub-factors:
		
		(2.4.17) Labour Regulations
		(2.4.18) Unemployment Legislation
		(2.4.19) Immigration Laws
		(2.4.20) Firing Costs/Redundancy Cost
		(2.4.21) Labour Market Flexibility
			Govt. Efficiency Factor
			➢ Business Legislation Sub-factor
			  o Sub-sub-factors:
			
			(2.4.17) Labour Regulations
			(2.4.18) Unemployment Legislation
			(2.4.19) Immigration Laws
			(2.4.20) Redundancy Cost

Note: Numbers in brackets next to components' names reflect the structure of the index and match the numbering of the IMD data tables.

Variables definitions:

Labour Regulations: Survey question: "Labour regulations (hiring and firing practices, minimum wages etc.) … 1 = are not flexible enough, 6 = are flexible enough".

Unemployment Legislation: Survey question: "Unemployment Legislation … 1 = does not provide any incentives to look for work, 6 = provides an incentive to look for work"

Immigration Laws: Survey question: "Immigration Laws… 1 = prevent your company from employing foreign labour, 6 = do not prevent your company from employing foreign labour"

Firing/Redundancy Costs: Measures the cost of advance notice requirements, severance payments and penalties due to a terminated worker, expressed in weekly wages. Source: The World Bank, Doing Business 2009. This indicator is reported as Redundancy Cost from 2010 onwards. In 2009-2010, reference is made to the worker profile with 20 years of tenure. From 2011 onwards, reference is made to the workers profile with 1, 5, and 10 years of tenure.

Labour Market Flexibility: The rigidity of employment is the average of three subindices: a difficulty of hiring index, a rigidity of hours index and difficulty of firing index. Subindices have several components, all taking value between 0 and 100, with higher values indicating more rigid regulation. Source: World Bank, Doing Business 2009.

All IMD data are reported in terms of standardized values, using the Standard Deviation Method conversion. This allows measuring the relative difference between the economies' performances. For each variable, standardized value is computed by subtracting the average value of all sampled economies from the economy's original value and then dividing the result by the standard deviation. For more information, see IMD reports.

Appendix 3.1 Fraser economic freedom of the world: Labour market regulation components and methodology

Year of the report issue	2001	2002 - 2006	2007 - 2009	2010 - 2012
Latest year of the reported data	2000	2000 - 2004	2005 - 2007	2008 - 2010
Number of countries	58	123 - 130	141	141-144
Components	1) Minimum Wages 2) Hiring and Firing 3) Collective Bargaining 4) Unemployment Benefits 5) Conscription 6) Top marginal tax rate	1) Minimum Wages* 2) Hiring and Firing 3) Collective Bargaining* 4) Unemployment Benefits* 5) Conscription*	1) Minimum Wages 2) Hiring and Firing 3) Collective Bargaining 4) Mandated Cost of Hiring* 5) Mandated cost of worker dismissal* 6) Conscription	1) Hiring regulations and Minimum Wages* 2) Hiring and Firing 3) Collective Bargaining 4) Hours Regulations* 5) Mandated cost of worker dismissal 6) Conscription
Aggregation methodology: LM index	Simple average; reported for components 1-6 (labour market regulations) and for components 1-4 (labour market flexibility)	Simple average of components 1-5	Simple average of components 1-6	Simple average of components 1-6
Aggregation methodology: overall index	Simple average of 7 topical areas, labour market regulations being one of them	Simple average of 5 topical areas, divided into 21 sub-components, labour market regulations being one of them. These are further divided into 38 components.	Simple average of 5 topical areas, divided into 23 sub-components, labour market regulations being one of them. These are further divided into 42 components.	Simple average of 5topical areas, divided into 23 sub-components (24 in 2012), labour market regulations being one of them. These are further divided into 42 components.

Note: Variables in italics and with asterisks are those for which definitions changed in a reported period.

Variables' definitions and sources, 2001:

Minimum wages: Survey question: "The minimum wage, set by law, has little impact on wages because it is too low or not obeyed". Answers: 1=strongly disagree, 7=strongly agree. Source: Global Competitiveness Report 2000, World Economic Forum (2000).

Hiring and Firing: Survey question: "Hiring and firing of workers is … 1=impeded by regulations, 7=flexibly determined by employers". Source: Global Competitiveness Report 2000, World Economic Forum (2000). The wording of this question varied slightly over the years.

Collective bargaining: 2001-2005: "Share of labour force whose wages are set by centralized collective bargaining" This particular component was not presented in the GCR publication due to space constraints but the data were provided directly by the World Economic Forum. From 2006 on: "Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7)." World Economic Forum, Global Competitiveness Report (various issues).

Unemployment Benefits: Survey question: "The unemployment insurance program strikes a good balance between social protection and preserving work incentives". Answers: 1=strongly disagree, 7=strongly agree. Source: Global Competitiveness Report 2000, World Economic Forum (2000).

Conscription: Data on the use and duration of military conscription were used to construct rating intervals. Countries with longer conscription periods received lower ratings. A rating of 10 was signed to countries without military conscription. When length of conscription was six months or less, countries were given a rating of 5. When length of conscription was more than six months but not more than 12 months, countries were rated at 3. When length of conscription was more than 12 months but not more than 18 months, countries were assigned a rating of 1. When conscription periods exceeded 18 months, countries were rated zero. Source: International Institute for Strategic Studies, The Military Balance (various issues)

Top marginal tax rate: Countries with higher marginal tax rates that take effect at lower income thresholds received lower ratings based on the matrix below. The income threshold data were converted from local currency to 1982/1984 US dollars (using beginning-of-year exchange rates and the US Consumer Price Index). The figures included sub-national rates if applicable. Source: Price Waterhouse, Individual Taxes: A Worldwide Summary (various issues).

Variables' definitions and sources, changes over time:

Minimum wages (from 2002 to 2005): Survey question: "The minimum wage set by law in your country is... 1=never enforced; 7=strongly enforced". Source: Global Competitiveness Reports, World Economic Forum (various issues).

Minimum Wages (from 2006 on): This component is based on the World Bank's Doing Business data for the ratio of mandated minimum wage to the average value added per worker, a component part of the "Difficulty of Hiring Index". Countries with higher mandated minimum wages relative to average value added per worker are given lower ratings. The formula used to calculate the zero-to-10 ratings for this component was: (Vmax − Vi) / (Vmax − Vmin) multiplied by 10. Vi represents the minimum wage to average value added per worker ratio. The values for Vmax and Vmin were set at 79per cent (1.5 standard deviations above average) and 0, respectively. Countries where the minimum wage was more than 79per cent of the average value added per worker were given a rating of zero. Countries with no minimum wage were given a rating of 10. Source: World Bank, Doing Business (various issues).

Unemployment benefits (2004): Based on two survey questions: 1) IMD Survey Question "Unemployment legislation". Answers: 1=does not provide an incentive to look for work; 6=provide an incentive to look for work. Source: International Institute for Management Development (IMD), World Competitiveness Yearbook (various issues). 2) GCR Survey Question "The unemployment insurance program strikes a good balance between social protection and preserving work incentives". Answers: 1=strongly disagree; 7=strongly agree. Source: Global Competitiveness Reports, World Economic Forum (various issues).

Unemployment benefits (2005, 2006): Based on IMD Survey Question "Unemployment legislation". Answers: 1=does not provide an incentive to look for work; 6=provide an incentive to look for work. Source: International Institute for Management Development (IMD), World Competitiveness Yearbook (various issues).

Conscription (from 2006 on): Source: International Institute for Strategic Studies, The Military Balance (various issues); War Resisters International, "Refusing to Bear Arms: A World Survey of Conscription and Conscientious Objection to Military Service," <http://www.wri-irg.org/co/rtba/index.html>.

Mandated Cost of Hiring: This sub-component is based on the World Bank's Doing Business data on the cost of all social security and payroll taxes and the cost of other mandated benefits including those for retirement, sickness, health care, maternity leave, family allowance, and paid vacations and holidays associated with hiring an employee. The formula used to calculate the zero-to-10 ratings was: (Vmax − Vi) / (Vmax − Vmin) multiplied by 10. Vi represents the hiring cost (measured as a percentage of salary). The values for Vmax and Vmin were set at 33per cent (1.5 standard deviations above average) and 0per cent, respectively. Countries with values outside of the Vmax and Vmin range received ratings of either zero or 10 accordingly. Source: World Bank, Doing Business (various issues).

Mandated Cost of Worker Dismissal (from 2007 on). This sub-component is based on the World Bank's Doing Business data on the cost of the advance notice requirements, severance payments, and penalties due when dismissing a redundant worker. The formula used to calculate the zero-to-10 ratings was: (Vmax − Vi) / (Vmax − Vmin) multiplied by 10. Vi represents the dismissal cost (measured in weeks of wages). The values for Vmax and Vmin were set at 108 weeks (1.5 standard deviations above

average) and zero weeks, respectively. Countries with values outside of the Vmax and Vmin range received ratings of either zero or 10 accordingly. Source: World Bank, Doing Business (various issues)

Hiring Regulations and Minimum Wages (from 2010 on). This sub-component is based on the World Bank's Doing Business, Difficulty of Hiring Index, which is described as follows: "The difficulty of hiring index measures (i) whether fixed-term contracts are prohibited for permanent tasks; (ii) the maximum cumulative duration of fixed-term contracts; and (iii) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker. An economy is assigned a score of 1 if fixed-term contracts are prohibited for permanent tasks and a score of 0 if they can be used for any task. A score of 1 is assigned if the maximum cumulative duration of fixed-term contracts is less than 3 years; 0.5 if it is 3 years or more but less than 5 years; and 0 if fixed-term contracts can last 5 years or more. Finally, a score of 1 is assigned if the ratio of the minimum wage to the average value added per worker is 0.75 or more; 0.67 for a ratio of 0.50 or more but less than 0.75; 0.33 for a ratio of 0.25 or more but less than 0.50; and 0 for a ratio of less than 0.25." Countries with higher difficulty of hiring are given lower ratings. This component previously measured only the minimum wage sub-component of the Difficulty of Hiring Index. From 2010, the data have been revised back to 2002. Source World Bank, Doing Business (various issues).

Hours regulations (from 2010 on): This sub-component is based on the World Bank's Doing Business, Rigidity of Hours Index, which is described as follows: "The rigidity of hours index has 5 components: (i) whether there are restrictions on night work; (ii) whether there are restrictions on weekly holiday work; (iii) whether the work-week can consist of 5.5 days; (iv) whether the work-week can extend to 50 hours or more (including overtime) for 2 months a year to respond to a seasonal increase in production; and (v) whether paid annual vacation is 21 working days or fewer. For questions (i) and (ii), when restrictions other than premiums apply, a score of 1 is given. If the only restriction is a premium for night work and weekly holiday work, a score of 0, 0.33, 0.66, or 1 is given according to the quartile in which the economy's premium falls. If there are no restrictions, the economy receives a score of 0. For questions (iii), (iv) and (v), when the answer is no, a score of 1 is assigned; otherwise a score of 0 is assigned." Countries with less rigid work rules receive better scores in this component. This component was previously named "Mandated cost of hiring a worker". Because of the pressure from ILO this indicator was dropped from Doing Business. In order to maintain as much consistency over time as possible, the data have been revised back to 2002 with these data replacing the previous values. Source World Bank, Doing Business (various issues).

Appendix 3.2. Fraser economic freedom of the world: Components and methodology. Example of Argentina

Report Year	Data Year	Components corresponding to the sub-component "Labor Market Regulation", as reported in Fraser, and their values						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2003	2001	5Bi Impact of minimum wage (GCR)	5Bii Hiring and firing practices (GCR)	5Biii Labour force share with wages set by centralized collective bargaining (GCR)	5Biv Unemployment insurance (GCR)		5Bv Use of conscripts	5B Labour Market Regulations
		4.4	2.4	*5.1*	*6.0*	.	10	5.6
2010	2001	5Bi Impact of minimum wage	5Bii Hiring and firing practices	5Biii Labour force share with wages set by centralized collective bargaining	5Biv Unemployment insurance ~~Mandated hiring costs~~	5Bv Mandated dismissal costs	5Bvi Use of conscripts	5B Labour Market Regulations
		4.4	2.4	*5.1*	*6.0*	.	10	5.6
2010	2002	5Bi Hiring Regulations and Minimum Wage (DB) ~~Minimum wage~~	5Bii Hiring and firing regulations (GCR)	5Biii Centralized collective bargaining (GCR)	5Biv Hours Regulations ~~Unemployment insurance Mandated hiring costs~~	5Bv Mandated dismissal costs	5Bvi Use of conscripts	5B Labour Market Regulations
		6.7	1.5	5.7	8.0	0.0	10	5.3
2012	2001	5Bi Hiring regulations and minimum wage	5Bii Hiring and firing regulations	5Biii Centralized collective bargaining	5Biv Hours Regulations	5Bv Mandated cost of worker dismissal	5Bvi Conscription	5B Labour market regulations
		4.4	2.4	*5.1*	*6.0*	.	10	5.6
2012	2002	5Bi Hiring regulations and minimum wage	5Bii Hiring and firing regulations	5Biii Centralized collective bargaining	5Biv Hours Regulations	5Bv Mandated cost of worker dismissal	5Bvi Conscription	5B Labour market regulations
		6.7	1.5	5.7	8.0	0.0	10.0	5.3

Note: Column (1) corresponds to the year on which a Fraser report was released, together with accompanying data. Column (2) shows sample years, and subsequent columns show data for these specific sample years, as reported in accompanying data files. The names of the components (including crossed out words) are reported as in the Fraser accompanying data files. For 2003 report year, missing column (7) is deliberately added to ease comparisons. Of note is changing names of components in columns 3, 5, and 6, and unchanged data for 2001.

Conditions of Work and Employment Series

No. 1 Quality of working life: A review on changes in work organization, conditions of employment and work-life arrangements (2003), by H. Gospel

No. 2 Sexual harassment at work: A review of preventive measures (2005), by D. McCann

No. 3 Statistics on working time arrangements based on time-use survey data (2003), by A. S. Harvey, J. Gershuny, K. Fisher & A. Akbari

No. 4 The definition, classification and measurement of working time arrangements (2003), by D. Bell & P. Elias

No. 5 Reconciling work and family: Issues and policies in Japan (2003), by M. Abe, C. Hamamoto & S. Tanaka

No. 6 Reconciling work and family: Issues and policies in the Republic of Korea (2004), by T.H. Kim & K.K. Kim

No. 7 Domestic work, conditions of work and employment: A legal perspective (2003), by J.M. Ramirez-Machado

No. 8 Reconciling work and family: Issues and policies in Brazil (2004), by B. Sorj

No. 9 Employment conditions in an ageing world: Meeting the working time challenge (2004), by A. Jolivet & S. Lee

No. 10 Designing programmes to improve working and employment conditions in the informal economy: A literature review (2004), by Dr. R.D. Rinehart

No. 11 Working time in transition: The dual task of standardization and flexibilization in China (2005), by X. Zeng, L. Lu & S.U. Idris

No. 12 Compressed working weeks (2006), by P. Tucker

No. 13 Étude sur les temps de travail et l'organisation du travail: Le cas du Sénégal. Analyse juridique et enquête auprès des entreprises (2006), by A. Ndiaye

No. 14 Reconciling work and family: Issues and policies in Thailand (2006), by K. Kusakabe

No. 15 Conditions of work and employment for older workers in industrialized countries: Understanding the issues (2006), by N.S. Ghosheh Jr., S. Lee & D. McCann

No. 16 Wage fixing in the informal economy: Evidence from Brazil, India, Indonesia and South Africa (2006) by C. Saget

No. 18 Reconciling work and family: Issues and policies in Trinidad and Tobago (2008), by R. Reddock & Y. Bobb-Smith

No. 19 Minding the gaps: Non-regular employment and labour market segmentation in the Republic of Korea (2007) by B.H. Lee & S. Lee

No. 20 Age discrimination and older workers: Theory and legislation in comparative context (2008), by N. Ghosheh

No. 21 Labour market regulation: Motives, measures, effects (2009), by G. Bertola

No. 22 Reconciling work and family: Issues and policies in China (2009), by Liu Bohong, Zhang Yongying & Li Yani

No. 23 Domestic work and domestic workers in Ghana: An overview of the legal regime and practice (2009), by D. Tsikata

No. 24 A comparison of public and private sector earnings in Jordan (2010), by C. Dougherty

No. 25 The German work-sharing scheme: An instrument for the crisis (2010), by A. Crimmann, F. Weissner & L. Bellmann

No. 26 Extending the coverage of minimum wages in India: Simulations from household data (2010), by P. Belser & U. Rani

No. 27 The legal regulation of working time in domestic work (2010), by Deirdre Mc Cann & Jill Murray

No. 28 What do we know about low-wage work and low-wage workers (2011), by Damian Grimshaw

No. 29 Estimating a living wage: a methodological review (2011), by Richard Anker

No. 30 Measuring the economic and social value of domestic work: conceptual and methodological framework (2011), by Debbie Budlender

No. 31 Working Time, Health, and Safety: a Research Synthesis Paper (2012), prepared by Philip Tucker and Simon Folkard, on behalf of Simon Folkard Associates Ltd

No. 32 The influence of working time arrangements on work-life integration or 'balance': A review of the international evidence (2012), by Colette Fagan, Clare Lyonette, Mark Smith and Abril Saldaña-Tejeda

No. 33 The Effects of Working Time on Productivity and Firm Performance: a research synthesis paper (2012), by Lonnie Golden

No. 34 Estudio sobre trabajo doméstico en Uruguay (2012), by Dra. Karina Batthyány

No. 35 Why have wage shares fallen? A panel analysis of the determinants of functional income distribution (2012), by Engelbert Stockhammer

No. 36 Wage-led or Profit-led Supply: Wages, Productivity and Investment (2012), by Servaas Storm & C.W.M. Naastepad

No. 37 Financialisation and the requirements and potentials for wage-led recovery – a review focussing on the G20 (2012), by Eckhard Hein and Matthias Mundt

No. 38 Wage Protection Legislation in Africa (2012), by Najati Ghosheh

No. 39   Income inequality as a cause of the Great Recession? A survey of current debates (2012), by Simon Sturn & Till van Treeck

No. 40   Is aggregate demand wage-led or profit-led? National and global effects (2012), by Özlem Onaran & Giorgos Galanis

No. 41   Wage-led growth: Concept, theories and policies (2012), by Marc Lavoie & Engelbert Stockhammer

No. 42   The visible face of Women's invisible labour: domestic workers in Turkey (2013), by Seyhan Erdoğdu & Gülay Toksöz

No. 43   In search of good quality part-time employment (2013), by Colette Fagan, Helen Norman, Mark Smith & María C. González Menéndez

No. 44   The use of working time-related crisis response measures during the Great Recession (2013), by Angelika Kümmerling & Steffen Lehndorff

No. 45   Analysis of employment, real wage, and productivity trends in South Africa since 1994 (2014), by Martin Wittenberg

No. 46   Poverty, inequality and employment in Chile (2014), by Sarah Gammage, Tomás Alburquerque & Gonzálo Durán

No. 47   Deregulating labour markets: How robust is the analysis of recent IMF working papers? (2014), by Mariya Aleksynska

No. 48   Growth with equity in Singapore: Challenges and prospects (2014), by Hui Weng Tat & Ruby Toh

No. 49   Informality and employment quality in Argentina, Country case study on labour market segmentation (2014), by Fabio Bertranou, Luis Casanova, Maribel Jiménez & Mónica Jiménez