Regional Inequality in Multidimensional Quality of Employment (QoE): Insights from Chile, 1996-2017

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Abstract

This paper uses a multi-dimensional methodology for measuring the quality of employment (QoE) across Chile's regions using household survey data from 1996 – 2017. The paper shows how much a regional perspective can add to an analysis of the QoE and how it can inform policy makers in a way that goes beyond traditional variables such as participation or unemployment rates, which are not always good indicators of labour market performance in developing countries with large informal sectors.

Building on previous work that measures QoE deprivation, we use the Alkire/Foster (AF) method to construct a synthetic indicator of the quality of employment (QoE) *at an individual level.* We select three dimensions that must be considered as both instrumentally and intrinsically important to workers: income, job security and employment conditions. Job security is then divided into two sub-dimensions (occupational status and job tenure), as is employment conditions (social security affiliation and excessive working hours). A threshold is then established within each dimension and sub-dimension to determine whether a person is deprived or not within each dimension, before calculating composite levels of deprivation.

The results generated by this index highlight important differences between Chile's regions, but also a process of convergence, which has been driven by employment regulation on minimum wages and the statutory working week in particular. National policies such as the improvement of educational standards have also contributed to this process. On the one hand, this paper illustrates the importance of public policies in labour market performance, and on the other, the index also enables policy makers to focus more precisely on the most vulnerable groups of workers in the labour market. This paper opens up important avenues for future research: once a QoE index has been developed, it can be used to track workers' employment trajectories using either panel or administrative data. This would allow policy makers to understand, whether and to what extent workers become trapped in poor quality jobs, and what active labour market policies could do to help them.

Keywords: Quality of employment, Latin America, labour markets, capability approach, Alkire/Foster method, multi-dimensional index.

1. Introduction

In recent years, the combined effects of globalisation and market liberalisation have led to the increased flexibilisation of employment conditions in both developed and developing countries. Many workers around the world are being hired on a short-term, freelance, subcontracted or even "zero hour" basis. In developing countries, formal employment has become more precarious, while levels of "informal employment" have not always diminished.

The study of employment conditions has therefore received an increased amount of attention from academics, international institutions and policymakers alike. These efforts have been mirrored by the regional studies literature, which has looked beyond researching how (un)employment and wage patterns behave across regions[1] to examining how the different employment conditions have changed and are distributed at the regional level.[2] While this leaves us with a better picture of how *particular* employment conditions, such as non-traditional forms of employment, have changed, the existing literature does not provide a summarised overview of these changes that allows us to analyse how the Quality of Employment (QoE) *as a whole* has developed across regions, leaving policymakers with a fragmented picture of the state of regional labour markets.

From the regional perspective, the existing literature on the QoE suffers from three main drawbacks: first, most indicators look at employment conditions from a macro perspective and thus ignore regional heterogeneity (OECD, 2014; IBD, 2017). For example, the OECD's component indicators are average earnings, inequality (measured by the Gini index), unemployment risk and insurance, job demands and resources. Although these indicators could be produced at the regional level, they cannot be reproduced at the level of individual workers, which would allow for a much more nuanced spatial analysis. Second, this literature measures the QoE by means of dashboard indicators that present employment conditions individually without summarising them in a single indicator (OECD, 2014 and 2017; Green and Mostafa, 2012; Soffia, 2019). Breaking these results down by region would then produces such a plethora of indicators that the results would become impossible to analyse, which makes them an instrument ill-suited to regional analysis. Third, restrictions to sample sizes in surveys of employment conditions mean that a regional breakdown would not be statistically valid.[3]

[1] See for example Riley, 1992; Green, 1999; Sheamur and Polese, 2007; Martin and Tyler, 2010; Pellandra, 2015.

[2] Green and Livanos, 2015; Caro and Nicotra, 2016; Pawan, 2013; McCollum, 2013; Quintana et al., 2017; Iglesias et al., 2010, Goos and Manning, 2007; Jones and Green, 2009.

[3] This is the case for all measures that use the European Working Conditions Survey, which uses country samples of approximately 1000 cases and is therefore not representative at the regional level within countries. Similar limitations for the production of regional indicators have also been reported for the case of The European Union Statistics on Income and Living Conditions (EU-SILC) (Verma et al,

In developing countries, data availability is even more restricted, but the need for a summary indicator is even greater as regional disparities are characterised by even sharper inequalities. Given the need for a summary indicator of the QoE that can serve the purposes of policymakers, Sehnbruch et al. (2020) propose a synthetic indicator of the QoE for nine countries in Latin America that undertake such decompositions, and that can – theoretically – be broken down by regions.[4] This paper, however, is limited by its purpose as an overview paper that presents a new methodology. It does not look into any country in depth, for example by analysing trends over time or across regions. This paper therefore aims to fill this gap in the existing literature by examining the case of Chile between 1996 and 2017 and by testing the usefulness of a regional synthetic indicator.[5] Chile is well known as Latin America's most successful case study, which has achieved both steady economic growth as well as significant improvements in its human development indicators despite persistently high levels of inequality (Lopez and Miller, 2008). For example, a recent study of the quality-of-life in the OECD's regions shows that 9 of Chile's 15 regions are among the 20 OECD regions that have experienced the highest growth in their multi-dimensional standard of living between 2003 and 2012 (Veneri and Murtin, 2018). Yet, as will be discussed below, regional disparities and inequalities remain significant despite these improvements (Aroca et al., 2018; Atienza et al., 2020; OECD, 2018).

This paper makes several contributions to the regional literature on employment. First, it shows how researchers and policy makers can precisely identify the most vulnerable groups of workers in regional labour markets, as well as the factors, which most contribute to their deprivation. This identification is particularly important at a time when many vulnerable workers are particularly at risk as a result of the current Covid crisis. Second, it shows that we must look beyond single issues (eg. informality or particular types of contract) to the general concept of job quality to obtain a better picture of how labour markets develop. A synthetic index is much easier to interpret when it comes to extending this analysis to regions than dashboard indicators, which are difficult to interpret in a comparative context. Having said this, once overall trends have been summarised, these results may then be disaggregated to examine the contributions of individual dimensions to the overall result. Third, the overall development of the QoE can be analysed in conjunction with indicators of the quantity of employment and economic growth at the regional level. Fourth, the results presented show how national legislation impacts regional outcomes: in Chile's case, the data allows us to analyse how the regulation of the working week and the minimum

2017; Goedemé, 2013; European Union, 2010). The European labour force survey (EU-LFS) can be used to produce subnational regional indicators of employment (Betti et al., 2012; Eurostat, 2020), but has not been used to produce a synthetic Quality of Employment indicator.

[4] This paper is replicated by Apablaza et al. (2020) for 6 Central American countries and by Mancero et al. (2021) for the whole of the Latin American region.

[5] This period was chosen because it comprises the longest period for which comparable data, including important employment quality indicators, from Chile's household survey is available.

wage contributed to regional convergence in QoE results. In addition, the econometric analysis illustrates the importance of national education policies in levelling the skill premium that was commanded by more educated workers. The contributions that this paper makes may therefore be useful to other countries – both developed and developing.

Finally, this paper opens up important avenues for future research: once a QoE index has been developed, it can be used to track workers' employment trajectories using either panel or administrative data. This would allow analysts to understand mobility across regions, whether and to what extent workers become trapped in poor quality jobs, and which active labour market policies could help them.

This paper proceeds as follows: after a much-abbreviated literature review of the QoE as it relates to both developed and developing countries, it presents the datasets used for this paper and explains the particularities of the Chilean case. It goes on to present how the AF method has been adapted to measure QoE deprivation and describes the rationale for the dimensions included in the index, as well as the cut-off lines established, and the weights used. The results of this QoE index for Chile's regions are then analysed before the paper concludes and discusses the implications of this research.

2. The Quality of Employment in the Regional Literature

An extensive analysis has been undertaken in the economic geography literature on the relationship between economic growth and employment in the regions of different countries, noting the regional inequalities that are found.[6] However, there is a consensus in this literature that variables such as (un)employment rates or wage differentials do not present a complete picture of how job characteristics differ across regions (Green and Livanos, 2015). These authors for example examine involuntary non-standard employment (part-time and temporary) in the UK and conclude that since the Great Recession in the UK, relatively low unemployment rates disguise a much greater impact on levels of involuntary non-standard employment (INE). "The findings indicate that policy action on the demand side, as well as on the supply side, is crucial to counter INE. (page 1233)" Similarly, Jones and Green (2009) examine changes in the quantity and quality of jobs in the regions of the UK over ten years and conclude "that it is the quality of jobs as much as the quantity of jobs, which is important in terms of assessing the relative positions and progress of regional economies" (page

[6] See for example Reilley (1992) and Paredes et al. (2014) on wage differentials in Great Britain and Chile respectively; Blanchard and Katz (1992) and Krugman (1993) on the US; Green (1999). On unemployment and non-employment in Europe; Martin and Tyler (2000) on the US and Europe; and Sheamur and Polese (2007) on Canada.

2474). These conclusions are echoed by McCollum (2013), who examines how workers in the UK switch between unemployment and low-quality jobs on a permanent basis, as well as by Goos and Manning (2007), although the latter use wages as an indicator of overall job quality.

In some European countries, the issue of job quality has become especially important as short-term hiring mechanisms have been introduced in an attempt to increase overall employment rates. Iglesias et al (Dueñas et al., 2010; 2011), for example, examine how the QoE and worker satisfaction levels relate to each other in different Spanish regions, finding that workers in Madrid have the best objective job quality, but poor satisfaction levels. Furthermore, the role of institutions is crucial in determining the employment opportunities of specific groups of workers. Arranz et al (2019) examine non-wage job quality in Europe and find that countries where the wage-bargaining system is more coordinated or centralised and where employment protection of regular workers is stricter, these institutions tend to favour the job quality of older workers. Moreover, the models developed by Di Cataldo and Rodríguez-Pose (2017) for analysing the drivers of employment in eighteen European Union countries find that regional public institutions and human capital endowments are the two main factors for the generation of employment and reduction of labour exclusion in less developed regions.

In developing countries, the literature has also examined disparities of employment across regions and territories. Akyelken (2013) examined the interaction effects between human capital, transport infrastructure and employment in twelve Turkish regions. In the case of India, Pawan Tamvada (2015) looks at the determinants of informal self-employment across regions, and Kumar and Pattanaik (2020) observed regional disparities between industrial growth, labour productivity and supply of labour across eighteen Indian States.

In Latin America, Quintana et al. (2020) have examined the impact of precariousness on income inequalities in Brazil, Mexico and Ecuador. They conclude that in Brazil the disparity of inequality across regions has improved, in Mexico it has deteriorated, while in Ecuador the results are inconclusive. However, metropolitan areas can also be highly unequal: Fernández de Córdova et al. (2016) show that employment opportunities are concentrated in the metropolitan cores but are scarce in peripherical areas. In general, available literature for regional convergence and disparities on labour and well-being in different Latin American countries indicates the importance of social and productive infrastructure (Volpe Martincus et al., 2017; Castillo et al., 2017) as well as geographic isolation and levels of education (Berdegué and Soloaga, 2018; Royuela and García, 2015).

These studies reinforce the idea that it is not enough to examine regional dispersions of the quantity of employment; we must also look systematically at the QoE, however, this may be defined. What is problematic with this approach, though is that it leads to

very fragmented conclusions. It is therefore challenging to get an overview of how and why particular regions are being affected more or less by precarious employment relationships. Regions inevitably present different characteristics, especially in terms of their sector composition in the commoditised economies of Latin America. In Chile, for example, at least 1 out of 5 workers in the O'Higgins, Maule and Ñuble regions work in the agricultural sector, while Antofagasta in the north employs 26.4% of all workers in the mining industry. By contrast, in Aysen, an isolated and less populated region in the extreme south, the public sector provides most employment (15.1%) (INE, 2020). Even more challenging is the task of comparing regional indicators across Latin American countries, as data availability, quality and comparability vary significantly (Bourguignon, 2015).

In part, this lack of comparability can be explained by the fact that most of the literature on employment quality or precariousness does not specify how these concepts should be measured (Burchell et al., 2014). For example, since launching its concept decent work in 1999, the ILO has put forward a plethora of definitions and variables that constitute decent work. It finally agreed a consensus definition in 2008, which comprises 11 dimensions and 71 indicators (ILO, 2013). Similarly, the EU has also struggled to define and measure the concept (Piasna et al., 2019). Only in 2014 did the OECD publish a job quality indicator that put forward a coherent definition and measurement of job quality, while the Inter-American Development Bank published a single summary indicator of job quality for the Latin American region in 2017. Unfortunately, the OECD's dashboard indicators are not based on microdata from individual workers but on aggregate statistics such as average earnings, inequality, unemployment risk, access to unemployment insurance, and job demands and resources. Also, given that the report presents a dashboard, this kind of analysis is very difficult to interpret at the regional level as it would lead to a plethora of tables. Finally, this kind of data is not available in developing countries so that the OECD's indicator cannot be replicated there. The IADB's indicator in turn summaries macro indicators (unemployment and participation rates and the proportion of informal and workers not earning a living wage) and could be replicated at the regional level. However, it combines indicators of labour market opportunities (job quantity) with job quality, which precludes an analysis of their interrelationship. The index further does not include variables on job characteristics that are equally important, such as social security coverage, the occupational status of workers or job stability.

It is for this reason that this paper follows Sehnbruch et al. (2020), which develops a methodology for measuring QoE deprivation across Latin America from a multi-dimensional perspective using the Alkire Foster (AF) method to break up traditional perspectives of the performance of labour markets in developing countries.[7] To the

[7] See also Sehnbruch (2006 and 2008), Lugo (2007), Decanq & Lugo (2012) and Leβmann (2012) on employment and the capability approach. This paper further adapts the framework of Alkire and Santos (2014) on multidimensional poverty published by World Development to the subject of the QoE.

best of the authors' knowledge, this is the first academic paper that constructs a multi-dimensional synthetic index of the QoE deprivation in a developing country over time to show that the QoE can be summarised in a single index using a range of meaningful and comparable variables that allow for the comparison of different regions. The methodology uses microdata so that it can be broken down to examine regional inequalities and can thus identify the most vulnerable workers in each region.[8] It can further show how the QoE relates to other measures of labour market performance, such as economic growth or improving levels of education. An additional key advantage of looking at a the QoE within a country over time and across different regions is that the impact of regulatory changes applied at the national can be examined.

3. Case Selection: Why Chile?

Chile is a long thin country that extends from the Arctic Circle in the south to the world's most arid desert in the north with 4300 km of coastline. The country is divided into 17 regions, with 41% of the national population concentrated in the Metropolitan Region of Santiago.[9] Chile's regions also have very different natural resource endowments: in the North, economic activities centre on copper mining; the central region presents a mixed composition of economic activity (including manufacturing, services, agriculture and some mining); the southern regions are dominated by the forestry, aquaculture and agricultural sectors, while in the extreme south, natural oil and gas as well as public sector employment predominate.

Chile is an interesting case study because its successful development process has led to increased GDP per capita levels, which have “graduated” the country from the list of countries that are officially classified as "developing" by the OECD.[10] However, these average figures disguise significant regional inequalities: territorial inequalities

[8] Sehnbruch et al. (2020) and Apablaza et al. (2020), for example, identify the most vulnerable workers in labour markets across Latin America, as well as examining gender inequalities across countries and looking at relationships with other indicators of macroeconomic performance. Arriagada et al. (2018) use this methodology to examine horizontal inequalities between migrants and the local population in Chile.

[9] Until 2007, there were 13 regions in Chile. In 2007, a part of the northernmost region (Tarapacá) was split off to form the new region Arica and Parinacota. In the south, the Los Ríos region was also split in two and a part of it became Los Lagos. In 2017, the Bío Bío region was similarly divided into two, forming the new region Ñuble and bringing the total number of regions up to 17. For the purposes of this paper, all indicators were calculated as though there had always been 13 regions in Chile as the data would otherwise not be comparable over time. This should not impact the results of the analysis presented, however, as the regions that were divided into two are similar in terms of their characteristics and productive structures.

[10] The OECD’s Development Assistance Committee (DAC) establishes a list of developing countries that are eligible for receiving Official Development Aid from Institutions such as the United Nations, the World Bank and national development funds. Chile (along with the Seychelles and Uruguay) “graduated” from this list in 2018.

among regions in Chile are the highest of all OECD countries (OECD, 2015, 2018). For example, the GDP per capita (PPP) of Chile's poorest region is analogous to Sri Lanka or Armenia, while the mining region of Antofagasta[11] is higher than Switzerland's. Overall, the GDP per capita of the Santiago region is similar to Greece's, and the Chilean average is comparable to that of Bulgaria (World Bank, 2020).

Chile is a highly centralised country in terms of its governing structure. Analysts criticise that policies are designed at the central level and are merely executed at the regional level (Aroca, 2009 and Paredes et al., 2014). For instance, minimum wages are set at the central government level regardless of local costs of living, which, particularly in the extreme regions, is quite high. Although there is a regional development fund (the Fondo Nacional de Desarrollo Regional) that is supposed to redistribute fiscal resources to Chile's regions, this fund is run by the central government (specifically by the Undersecretary of Regional Development, which is part of the Ministry of the Interior), and most of this funding still accrues to the Metropolitan Region. The fund thus exacerbates regional inequalities (Atienza and Aroca, 2012). The key inequalities are the concentration of property in Santiago, and higher paying jobs. Aroca and Fierro (2020), for example, use tax data to show that 80.3% of all sales registered in Chile are generated in the Metropolitan Region.

Most of the economic activity in Chile is therefore concentrated in the Metropolitan region of Santiago, which represents 46 percent of Chile's GDP, 43 percent of its labour force, and 52.9 percent of its workers with higher education. The other two regions that contribute a large portion to Chile's GDP are Antofagasta with 10% (based on the mining industry) and Bío Bío with 8% (based on the forestry sector).

During the period studied, poverty rates declined very significantly in all regions from 23.2% in 1996 to 8.6% in 2017 (Table 1). However, here again we find a 15% spread, ranging from 17% in Araucanía (traditionally always one of the least developed regions in the country) to 2% in Magallanes.[12]

[11] Although Antofagasta holds a comparably high GDP per capita, much of these gains have not remained within the region. Take, Atienza et al. (2020, p. 4) in which they state that within Chilean mining regions, including Antofagasta, whilst there has been gains of the recent commodity prices super-cycle there have also been trends in lower life quality indicators. For example, there has been a deterioration related to provision of public goods, negative externalities of the mining industry and the increasingly higher cost of living which has led to jeopardising economic and social sustainability and forming new forms of enclave economies.

[12] Anecdotally, Chileans will explain that you cannot live in the extreme south of Chile (Magallanes and Aysén) if you are poor as it is too cold there to survive on a low income. These regions generally have better social statistics than other regions in the country as they have a much lower population density (about 1 habitant per km^2, four times lower than the Northern desert regions) and harsher climate conditions (Interview with a Chilean expert on regional development, 28th July 2020).

Table 1. Regional Characteristics

Region	GDP per capita (PPP, current international USD)[a, b, c]			% National GDP [a,d]			% of National Labour Force [e, f]			Employment Rate (%) [e]		
	1996	2006	2017	1996	2006	2017	1996	2006	2017	1996	2006	2017
National	8,007	15,760	23,730	100.00	100.00	100.00	100.00	100.00	100.00	51.60	51.26	59.04
Tarapacá (TA)	19,973	34,484	29,383	3.61	3.57	2.29	2.69	3.00	1.89	54.13	53.76	62.31
Arica y Parinacota (AP)			14,749			0.77			1.20			56.12
Antofagasta (AN)	29,168	55,741	64,457	11.71	11.51	9.15	2.98	3.29	3.35	51.75	51.02	58.15
Atacama (AT)	12,716	20,682	34,441	2.74	2.22	2.37	1.77	1.73	1.64	53.71	53.90	60.79
Coquimbo (CO)	5,325	10,465	15,432	2.65	2.66	2.79	3.56	3.84	4.01	50.54	48.73	55.42
Valparaíso (VA)	7,918	13,578	19,236	9.96	8.79	8.28	9.70	10.04	10.07	47.41	49.09	57.15
ertador General Bernardo O'Higgins (	7,358	14,362	20,153	4.83	4.71	4.40	4.89	4.94	5.16	48.79	50.94	59.39
Maule (MA)	4,291	8,713	12,401	3.32	3.30	3.08	6.16	5.84	5.77	52.70	50.57	58.21
Bío Bío (BB)	5,373	13,205	19,233	8.51	7.81	7.16	11.93	11.29	7.80	48.08	46.70	51.56
Ñuble (ÑU)									2.47			52.86
Araucanía (AR)	3,712	6,688	10,983	2.69	2.43	2.55	5.00	5.36	5.02	45.95	49.44	54.43
Los Lagos (LL)	7,072	14,214	15,068	4.23	4.27	2.95	6.78	6.97	4.43	51.53	51.25	58.20
Los Ríos (LR)			14,259			1.29			2.12			58.69
Aysén (AY)	5,274	10,692	20,738	0.39	0.43	0.54	0.66	0.69	0.64	59.72	62.23	71.21
Magallanes (MG)	13,583	23,114	25,517	1.66	1.38	1.05	1.13	0.96	1.01	54.51	51.95	65.86
Región Metropolitana (RM)	9,013	15,699	24,681	44.74	40.19	42.39	42.74	42.06	43.42	54.44	53.39	62.33

Region	Unemployment Rate (%) [e, f]			Individuals with Higher Education (%) [g]			Poverty (%) [g] **		
	1996	2006	2017	1996	2006	2017	1996	2006	2017
National	5.39	6.01	6.51	6.52	11.01	15.17	23.21	29.11	8.59
Tarapacá (TA)	4.45	6.69	6.69	7.53	8.61	11.50	21.38	23.96	6.40
Arica y Parinacota (AP)			6.36					30.64	8.43
Antofagasta (AN)	3.23	7.25	8.83	5.98	9.93	13.40	16.37	12.33	5.13
Atacama (AT)	3.55	8.44	7.00	6.52	9.29	12.20	26.44	22.27	7.91
Coquimbo (CO)	3.45	5.10	7.16	4.78	7.06	9.93	30.11	37.88	11.88
Valparaíso (VA)	6.04	6.59	7.19	7.06	10.40	16.60	22.27	30.61	7.10
ertador General Bernardo O'Higgins (	5.01	3.04	6.38	4.16	7.65	11.00	26.56	32.61	10.08
Maule (MA)	5.15	6.16	5.64	3.60	7.25	9.77	32.56	43.88	12.73
Bío Bío (BB)	6.29	8.64	7.30	5.42	9.52	13.50	34.06	41.27	12.32
Ñuble (ÑU)			7.79						16.14
Araucanía (AR)	4.13	5.03	8.46	4.13	7.94	10.90	35.69	48.46	17.16
Los Lagos (LL)	2.84	5.20	2.93	4.10	7.21	11.40	32.25	29.30	11.70
Los Ríos (LR)			5.18					45.34	12.12
Aysén (AY)	0.89	1.78	2.90	4.66	8.65	15.50	22.44	22.96	4.60
Magallanes (MG)	3.14	4.06	3.14	4.89	11.80	17.20	13.66	12.80	2.13
Región Metropolitana (RM)	6.20	5.71	6.35	8.48	14.40	18.90	14.74	20.18	5.36

** In 2013, the Chilean government officially changed the national methodology for poverty estimation. Poverty rates displayed for years 2006 and 2017 follow the new methodology (MDS 2020). Rates displayed for year 1996 are referential, since they were estimated with the MDS' old methodology.
Source: [a]World Bank (2020), [b]INE (2020a), [c]INE & CEPAL (2005), [d]SUBDERE (n.d.), [e](INE 2020b), [f](INE 2020c) and [g]MDS (2020).

Table 1 further shows that these inequalities are reflected in the data on Chile's labour market. For instance, Chile's workforce grew 47% from 5.3 to 7.9 million between 1996 and 2017, with heterogeneous trends across regions. For instance, the number of workers in the mining region of Antofagasta increased by 64.5% while in the extreme south (Magallanes) it increased by only 29.7%. The regional distribution of workers also captures some of these changes. The same regions (Antofagasta and Magallanes) have increased and reduced their contribution to the national workforce

by 12%, respectively. On the other hand, between 1996 and 2017 the proportion of workers employed in the Metropolitan Region remains steady at around 42-43%.

Employment rates have increased by 7% since 1996 to 59%, but vary widely across regions, with a 71% employment rate in Aysen and 52% in Bío Bío (although 8 regions cluster around the national average). Between 1996 and 2017, Chile's unemployment rate increased somewhat to 6.8% and the regional rates fluctuate around this average with only Antofagasta and Araucanía experiencing higher increases to 9%, while the southern regions Los Lagos, Aysén and Magallanes have quite low rates at 3%.

4. Data and Methodology

4.1 Data

This paper draws on micro-data from Chile's National Household Survey (CASEN for its Spanish acronym) from multiple years between 1996 and 2017. However, we excluded the years 1998 and 2009 as key variables needed for the index we calculate were constructed differently in those years. The other years of the survey were selected because they allow for a long-term analysis of the change in QoE observed in Chile's regions, showing the country at different stages of its development process. The CASEN is one of the most extensive household surveys in Latin America with a sample size of 70,948 households and 216,439 individuals (Casen, 2017). It is conducted by Chile's Ministry of Social Development on a biennial or triennial basis. Each survey is representative at the national and regional level, and regional data can be analysed. The CASEN collects information on various characteristics of a household including labour market activity for individuals within the household. It has the largest sample size of all surveys in Chile, which makes the generation of robust regional calculations possible. Table A-1 in the Appendix presents further details on the samples used in this paper. Data from 1998 and 2009 was excluded due to the lack of comparable information.

4.2 The Alkire/Foster Method

Building on the Foster-Greer-Thorbecke poverty measures, Alkire and Foster (2011) propose to measure multi-dimensional poverty using a dual cut-off approach. This methodology has captured the attention of academics and policy makers alike, and several countries in Latin America have implemented official poverty measures based on this method.[13] The technique has also been extended to other subjects such as child poverty (Kim, 2019; Leturcq & Panico, 2019), energy poverty (Ogwumike & Ozughalu, 2016), women's empowerment (Galiè et al., 2019; Tsiboe et al., 2018) and

[13] See for example Alkire & Fang, 2019; Ke-Mei Chen, 2019; Ervin, 2018; and Pham & Mukhopadhaya, 2018.

also the labour market (García-Pérez et al., 2017; K. Sehnbruch et al., 2020) among many others.

The following paragraphs summarise how this paper applies the Alkire/Foster method to the subject of the QoE. The QoE index proposed observes a number of *d* dimensions or attributes for *n* individuals that define a *d* x *n* matrix. x_{ij} denotes the attributes presented by an individual *i* in each dimension *j* of the QoE index. A deprivation cut-off z_j for each dimension *j* under consideration then sets the minimum attributes required to be considered as non-deprived. This first cut-off allows the identification of those individuals who are deprived in each dimension. Therefore, a person *i* is deprived in a dimension *j* if $x_{ij}<z_j$, and is not deprived if $x_{ij}\geq z_j$. A deprivation matrix g^0 can be generated that summarises the deprivations of each individual *i* for any given dimension *j*. This matrix shows $g^0_{ij}= 1$ when $x_{ij}<z_j$, and $g^0_{ij}= 0$ if not. The sum of g^0_{ij} divided by the population is then defined as the raw headcount ratio.

Based on their deprivation profile, each person is assigned a deprivation score that reflects the breadth of their deprivations across all dimensions. The deprivation score is given by $c_i = \sum_1^d g_{ij}^0 \ w_j$, where w_j reflects the weight assigned to dimension *j* and $\sum_1^d w_j = 1$. The deprivation score of each person is the sum of their weighted deprivations. Formally, the deprivation score (c_i) increases as the number of deprivations a person experiences increases, and reaches its maximum of 1 when the person is deprived in all dimensions. A person who is not deprived in any dimension has a deprivation score equal to 0. The identification is straight forward: An individual *i* is considered to have poor QoE if their deprivation score is equal or higher than a certain cut-off *k*.

The headcount measure (*H(k)*) estimates the proportion of workers with poor QoE, i.e. the sum of the identified individuals who have a low QoE (i.e. at least *k* deprived dimensions) compared to the total population of workers under consideration. The average intensity share (*A(k)*) estimates the depth of deprivation in society. The intensity A can be described as the average deprivation score among those workers who have poor QoE divided by the total population. Finally, the aggregated measure $M_0(k)$ represents the percentage of individuals in poor QoE adjusted by how acute their condition is.

$$M_0(k) = \frac{1}{n}\sum_{i=1}^{n} \ [c_i \times I(c_i \geq k)] = H(k) \times A(k)$$

Where the identification function I (·) is equivalent to 1 if the content is true and 0 otherwise. The adjusted headcount ratio ($M_0(k)$) is calculated by multiplying the incidence (*H(k)*) by the intensity (*A(k)*). $M_0(k) = H(k) \times A(k)$. Regarding the direction of the measure, the QoE index and its subcomponents measure the lack of quality of employment, so, higher numbers imply a worse-off condition. $M_0(k)$ not only

summarises information about the occurrence and extent of low-quality employment but also fulfils a set of relevant axiomatic properties.[14] Among these, the dimensional and subgroup decomposition allows us to know which groups of workers have higher rates of deprivation and which job characteristic(s) contribute more to this result.

A crucial indicator that can be broken down into its constituent dimensions is the censored headcount. The censored headcount is the proportion of individuals who are deprived and poor at the same time $\mathrm{h_j(k)}$. When a union approach is implemented, the censored and the raw headcount are equivalent. When an intersection approach is used, the raw headcount will be equivalent to the headcount ratio (*H(k=100%)*). The weighted sum of the censored headcount ratios is equivalent to the $M_0(k)$ indicator.

$$M_0(k) = \sum_{j=1}^{d} w_j \frac{1}{n} \sum_{i=1}^{n} \mathrm{g}_{ij}^0 \times I(c_i \geq k)$$

4.3 Analysing Regional Differences

This paper further presents an econometric analysis of the incidence of poor quality employment in Chile over time, in terms of the regional and socio-economic factors that determine this outcome. Binary selection models are used since the outcome variable – QoE deprivation – is only observable for a selected sample of the survey data used. To be QoE deprived, a worker must be employed, which implies a sample selection problem as some (observable and unobservable) factors related to the outcome variable determine the fact that the individual is employed or not (Cameron and Trivedi, 2005; Heckman 1979). The widely accepted two-step Heckman probit procedure is therefore used to correct for the fact that workers with the complete set of data necessary to calculate their QoE Index may be systematically different from the original sample and labour force as a whole in Chile.

The two-step Heckman probit model entails that first a Probit regression is estimated for the likelihood of labour market participation. Heckman (1979) showed that, on respecting a series of conditions, the estimation by a standard probit model does not produce biased coefficients. The model proposed is thus a bivariate probit in the following form:

$$\Pr(W_{kj} = 1 \mid Z_{kj}) = \alpha + \gamma Z_{kj} + \varepsilon_{kj}$$
$$\Pr(Q_{kj} = 1 \mid X_{kj}) = \alpha + \beta X_{kj} + \lambda_{kj} + \upsilon_{kj}$$

[14] For more information on the properties of multidimensional indices, see Alkire and Foster (2011).

where W_{kj} is the dichotomous variable of the selection equation, which assumes the value of 1 if the individual is employed, and 0 otherwise; Z_{kj} is the set of covariates of the employment equation; Q_{kj} is the dichotomous variable which takes the value of 1 in the event of deprivation in employment quality and 0 otherwise, for every *k*th individual of the *j*th region; λ_{kj} is the inverse Mill's ratio estimated in the first equation and X_{kj} is the set of covariates which comprises the following explanatory variables: regional categorical variables using the Metropolitan Region (RM) as the reference category and years of education. The other included control (independent) variables are sex, experience, economic sector in which the worker is employed, size of firm and civil status. To avoid identification problems, the model presented controls for additional variables in the first-step regression Z_{kj} that are not used in the second regression X_{kj}. Theoretically these variables should be related to the selection variable (W_{kj}) and unrelated to the outcome of interest (Q_{kj}). This paper uses having children and educational level, which often influence labour market participation and are commonly used in the literature (Baum, 2006).

Finally, a multivariate decomposition for nonlinear responses using a probit model following Kitagawa-Oaxaca-Blinder-decomposition for gender differences (Blinder, 1973, Kitagawa, 1955, Oaxaca, 1973) is used to further understand the evolution between 1996 and 2017. This decomposition attempts to disentangle whether the wage differential between women and men is explained by differences in human capital endowments (average value of the independent variables) or in the returns of such endowments (the coefficients). The latter is attributed to gender discrimination. In the present context, the decomposition allows separating the effect of higher endowments that contribute to a better QoE in 2017 (for instance, increase in the number of school years completed) from the impact of different coefficients in the two periods (for example, an increase in the number of school years completed across the board might reduce the returns to schooling, which might attenuate the effect of the increase in the number of school years completed).

4.4 Dimensions, Indicators, Cut-Offs and Weights

The existing literature on job quality recommends including dimensions and indicators on the quality of labour earnings, employment stability and employment conditions (Green & Mostafa, 2012; OECD, 2014). The QoE index presented here follows the methodology used by Sehnbruch et al. (2020), which is based on this literature and includes the same three dimensions, which are equally weighted. Cut-off lines for each variable and for the overall index have also been adapted from Sehnbruch et al. (2020). Even though the indicators included in this index are not exhaustive due to the data constraints mentioned, they serve to capture the most essential characteristics of employment in Chile. The dimensions and indicators together with their respective weights and cut-off lines are summarised in Table 2 below.

Table 2. Dimensions, Indicators, Cut-Offs and Weights of the QoE Index

Dimensions (weight)	**Labour Income (1/3)**	**Employment Stability (1/3)**		**Employment Conditions (1/3)**	
Indicator (weight)	Income (1/3)	Occupational Status (1/6)	Tenure (1/6)	Social Security (1/6)	Excessive Working Hours (1/6)
Deprivation Cut-off	Less than 6 basic food baskets (monthly calculation)	No contract, Self-employed	Less than 3 years employed in current occupation. Individuals between the ages of 18 and 24 are not considered deprived in	No contributions to the pension system	More than 45 hours per week
Population	All occupied individuals between the age of 18-65, who report a monthly salary from their main occupation	All occupied individuals between the age of 18-65, who report on their occupational and contractual status	All occupied individuals between the ages of 18-65, who report the number of years employed in their current main occupation	All occupied individuals between the ages of 18-65, who report their affiliation to a pension scheme	All occupied individuals between the ages of 18-65, who report their hours worked during the past week

Note that the official definition and value of food baskets changed in Chile in 2013 to reflect changing standards of living and associated needs. In 2019 the Ministry of Social Development and Family (MDSF) published a series of poverty rates that use this new methodology, adjusting past data accordingly. This paper uses these updated food basket data. (MDSF & UNDP, 2019).
Source: Authors' own calculations with Casen household survey data.

Associations and correlations were explored at the indicator level for each year (see Appendix A-2). However, the final list of dimensions and indicators were primarily selected for normative reasons and based on data availability. Following Atkinson (2003), equal weights were considered due to the similar relative importance of each dimension and not necessarily at the indicator level.

The QoE cut-off was selected following the structure of other multi-dimensional indices such as the global multi-dimensional poverty index (Alkire and Santos, 2014). Given a set of three dimensions, an individual is considered deprived overall if they are deprived in at least one dimension in the case of income or two indicators that can be part of any dimension.

Table 3 presents an initial dashboard of the component indicators of the QoE index. The results illustrate that improvements in the individual dimensions of the QoE are very significant over the period studied, particularly in terms of income deprivation and excessive hours worked. The national average of income deprivation has improved by 24% overall, with some regions (Coquimbo, O'Higgins, Magallanes, Araucanía, Los Lagos and Los Ríos, and Aysén) improving significantly more than the national average. The proportion of workers working excessive hours has also declined notably in terms of the national average, with three regions (Atacama, O'Higgins and Magallanes) improving even more. However, the indicators of occupational status, tenure and social security contributions have improved by much less overall (5%, 1.4% and 4% respectively at the national level), and very few regions diverge from this trend (only O'Higgins in terms of occupational status and Magallanes in terms of social security).

Table 3. A Dashboard of Deprivation by Indicator (%)

Indicator	Year	Natl.	TA+ AP	AN	AT	CO	VA	OH	MA	BB	AR	LL+ LR	AY	MG	RM
Labour Income	1996	43.2	35.5	27.2	39.2	58.1	46.6	60.7	67.1	54	65.1	61.8	54.3	36.9	30.1
	2006	30	33.7	21.6	29	35	32.6	35	38.2	39	46.1	39.1	24	22	22.8
	2017	19.4	18.9	12.4	17.3	20.9	22.9	16.8	23.6	25.4	29.9	24.3	17.4	12.2	15.6
Occupational Status	1996	36.4	35.8	29.3	34.6	41.3	35.6	39	48.5	37.4	44.3	41	37.2	33.9	33.2
	2006	35.5	43.9	30.9	29.7	39.1	36.1	31.8	37.9	35.8	43.2	40.3	36.4	30.5	33.7
	2017	31.4	36.7	25.5	30.1	35.6	33.2	28.3	33.7	31.2	38.1	35.1	34.6	26.6	29.5
Tenure	1996	45.3	42.4	47.7	44.7	52.3	44.5	49.3	52.2	45.9	47	46	48.3	44.2	43.1
	2006	45.4	48.1	49.7	49.2	46.3	44.4	50.8	48.2	44.7	43.5	44.6	42.5	38.9	44.6
	2017	43.9	45.1	48	42	44.2	41.2	50.2	43.1	41.6	36.8	40.4	39.4	34.4	45.7
Social Security	1996	32.7	30.9	28.2	29.4	36.7	32	31.3	42.2	33.8	43.9	42.2	35	28.6	29.2
	2006	31.6	38.7	26	25.8	35	31.6	26	34.4	32.3	39.2	37	30.6	26.3	30.2
	2017	28.7	35	23.3	27.4	31.1	30.3	24.9	30.3	28.9	36	33.8	29	23.5	27
Excessive Working Hours	1996	59.1	55.8	70.6	72.8	63.1	60.8	72	66.4	61	65.4	60.2	63.3	55.2	53.6
	2006	35.3	44.5	40.4	37.6	36.8	36	30.4	32.4	35.3	36	35	31.5	33.8	35
	2017	20.1	32.9	31.6	28.3	24.9	20.9	11.5	17.1	20.1	22	16.8	29.4	25	19

Source: Authors' own calculations with Casen household survey data.

5. Results and Findings

5.1 Index Results: Regional Patterns and QoE Convergence

In 1996, 66.7% of the labour force had poor QoE, their average intensity of deprivation was 59.5%, and the overall QoE index was 0.40. Twenty-one years later, the deprivation and intensity levels had dropped to 41.3% and 53% respectively, producing an overall index result of 0.22. Thus, between 1996 and 2017, the national QoE deprivation index decreased by 44.8%.

Table 4 shows that QoE not only improved in all Chilean regions, but also that the performance of the regions has converged. Figure 1 shows this evolution of regional inequalities more clearly: in 1996 the QoE Index had a range of 0.23, from the lowest to the highest value. By 2017, this dispersion had decreased to 0.11. The boxplot below shows the weighted distribution of regions for each year, while the triangle within each bracket marks the national average, and a line marks the median index value. Bubbles are scaled to represent the number of deprived workers in each region for each year.

Each period shows an improvement – although not always a significant one – in terms of the national QoE index. On average, the QoE index improved by 2.1% in each period with a maximum improvement of 6.1% between 2003 and 2006. Overall, all regions in Chile improved their result during this entire period by more than 25%. Improvements in regional inequalities follow a similar pattern except between 1996 and 2000 when the median increased marginally.

Table 4. Quality of Employment Index Estimates

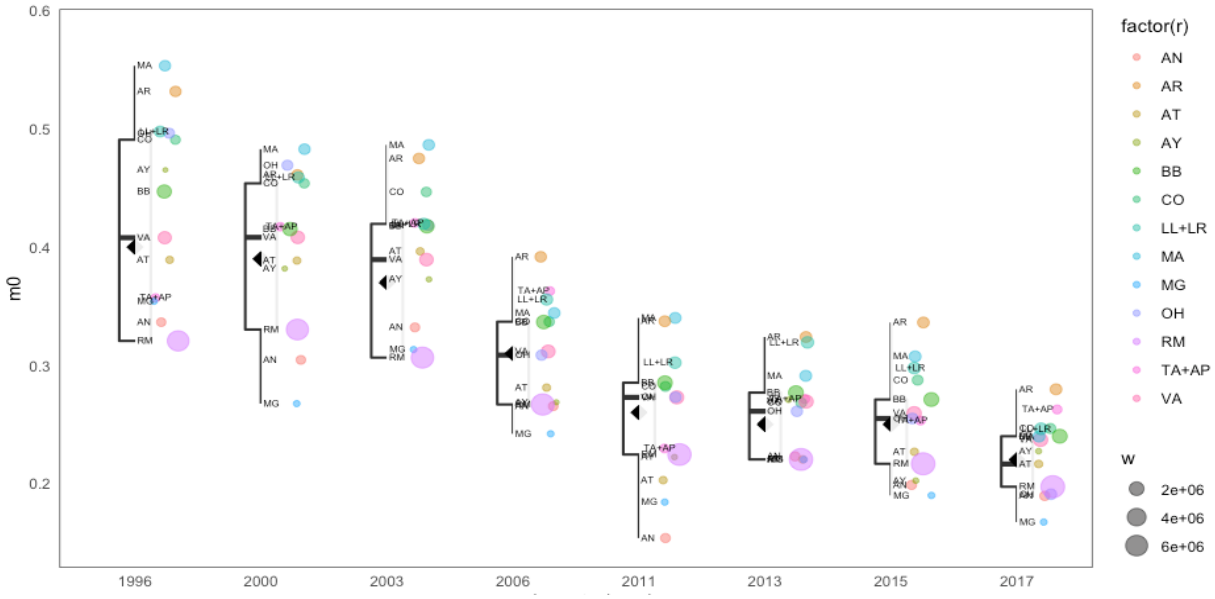
	Year	Natl.	TA+AP	AN	AT	CO	VA	OH	MA	BB	AR	LL+LR	AY	MG	RM
H	1996	66.7%	64.7%	62.2%	65.8%	77.4%	68.8%	78.2%	82.0%	71.4%	80.4%	78.4%	76.7%	61.3%	58.2%
		(0.00490)	*(0.0317)*	*(0.0243)*	*(0.0272)*	*(0.0168)*	*(0.0178)*	*(0.0128)*	*(0.0117)*	*(0.0153)*	*(0.0133)*	*(0.0147)*	*(0.0260)*	*(0.0446)*	*(0.00776)*
	2006	53.8%	62.2%	51.0%	50.2%	58.3%	55.1%	56.4%	58.6%	56.9%	0.649	0.612	50.0%	45.1%	49.2%
		(0.00392)	*(0.0236)*	*(0.0232)*	*(0.0212)*	*(0.0175)*	*(0.0111)*	*(0.0138)*	*(0.0169)*	*(0.00982)*	*(0.0132)*	*(0.0135)*	*(0.0241)*	*(0.0326)*	*(0.00663)*
	2017	41.3%	50.1%	39.2%	42.0%	46.1%	44.3%	36.8%	44.4%	43.3%	49.9%	45.3%	43.5%	34.8%	37.9%
		(0.00368)	*(0.0109)*	*(0.0138)*	*(0.018)*	*(0.015)*	*(0.008)*	*(0.010)*	*(0.013)*	*(0.009)*	*(0.012)*	*(0.008)*	*(0.016)*	*(0.014)*	*(0.00689)*
A	1996	59.5%	55.2%	54.1%	59.2%	63.4%	59.3%	63.5%	67.5%	62.6%	66.1%	63.5%	60.7%	57.7%	55.1%
		(0.00236)	*(0.0120)*	*(0.0114)*	*(0.0109)*	*(0.00795)*	*(0.00656)*	*(0.00742)*	*(0.00811)*	*(0.00548)*	*(0.00568)*	*(0.00799)*	*(0.0112)*	*(0.0150)*	*(0.00435)*
	2006	56.2%	58.3%	52.0%	56.0%	57.8%	56.6%	54.8%	58.7%	59.1%	60.3%	58.1%	53.8%	53.6%	54.2%
		(0.00186)	*(0.0111)*	*(0.00953)*	*(0.0116)*	*(0.00828)*	*(0.00470)*	*(0.00669)*	*(0.00624)*	*(0.00358)*	*(0.00630)*	*(0.00492)*	*(0.0109)*	*(0.0156)*	*(0.00354)*
	2017	53.0%	52.4%	48.3%	51.5%	53.4%	53.4%	51.9%	53.9%	55.4%	56.1%	54.4%	52.2%	48.1%	52.0%
		(0.00186)	*(0.005)*	*(0.007)*	*(0.008)*	*(0.006)*	*(0.004)*	*(0.005)*	*(0.006)*	*(0.005)*	*(0.005)*	*(0.004)*	*(0.009)*	*(0.007)*	*(0.004)*
M0	1996	0.40	0.36	0.34	0.39	0.49	0.41	0.50	0.55	0.45	0.53	0.50	0.47	0.35	0.32
		(0.00358)	*(0.0198)*	*(0.0160)*	*(0.0190)*	*(0.0130)*	*(0.0115)*	*(0.0106)*	*(0.0119)*	*(0.0113)*	*(0.0102)*	*(0.0124)*	*(0.0197)*	*(0.0294)*	*(0.00538)*
	2006	0.37	0.36	0.27	0.28	0.34	0.31	0.31	0.34	0.34	0.39	0.36	0.27	0.24	0.27
		(0.00250)	*(0.0160)*	*(0.0144)*	*(0.0144)*	*(0.0120)*	*(0.00679)*	*(0.00870)*	*(0.0118)*	*(0.00664)*	*(0.0102)*	*(0.00894)*	*(0.0132)*	*(0.0197)*	*(0.00424)*
	2017	0.22	0.26	0.19	0.22	0.25	0.24	0.19	0.24	0.24	0.28	0.25	0.23	0.17	0.20
		(0.00226)	*(0.00663)*	*(0.00770)*	*(0.0115)*	*(0.00815)*	*(0.00504)*	*(0.00559)*	*(0.00873)*	*(0.00582)*	*(0.00827)*	*(0.00521)*	*(0.00960)*	*(0.00749)*	*(0.00414)*

* Standard errors in parentheses. All indicators p<0.01

** TA = Tarapacá; AP = Arica y Parinacota; AN = Antofagasta; AT = Atacama; CO = Coquimbo; VA = Valparaíso; OH = O'Higgins; MA = Maule; BB = Bío-Bío; ÑU = Ñuble, AR = Araucanía; LL = Los Lagos; LR = Los Ríos; AY = Aysén; MG = Magallanes; RM = Región Metropolitana

Source: Authors' own calculations with Casen household survey data.

Figure 1. Changes over time Quality of Employment 1996-2017



Source: Authors' own calculations with Casen household survey data.

These results, however, are heterogeneous. While the region of O'Higgins improved the most (61.6%) and is the only one to have improved consistently, Tarapacá and Arica/Parinacota only improved by 26.5%. Ten out of thirteen regions have reduced their levels of poor QoE by 40 to 60% with five having at least halved their deprivation levels between 1996 and 2017.[15]

This analysis of convergence aims to explore whether regions are more equal in 2017 compared to 1996 in terms of their QoE. Following the seminal paper of Barro and Sala-i-Martin (1992), the beta convergence analysis evaluates the presence of a negative relationship between the initial level of an indicator and its evolution over time. In this case, a negative beta implies that those regions with the worst working conditions experience more significant improvements in the QoE. Sigma convergence, on the other hand, explores the cross-sectional dispersion of the regions over time (see Figure 2).

In general, regions that had higher levels of M_0 in 1996 tended to experience sharper declines in the index in subsequent years. Table 5 below shows that beta convergence confirms these patterns of change among regions in Chile over this period (1996-2017). A negative beta implies that regions with higher QoE deprivation show more considerable reductions in the index over time. The coefficient is relevant in the first decade but insignificant in the period 2006-2017.

Table 5. Beta Convergence

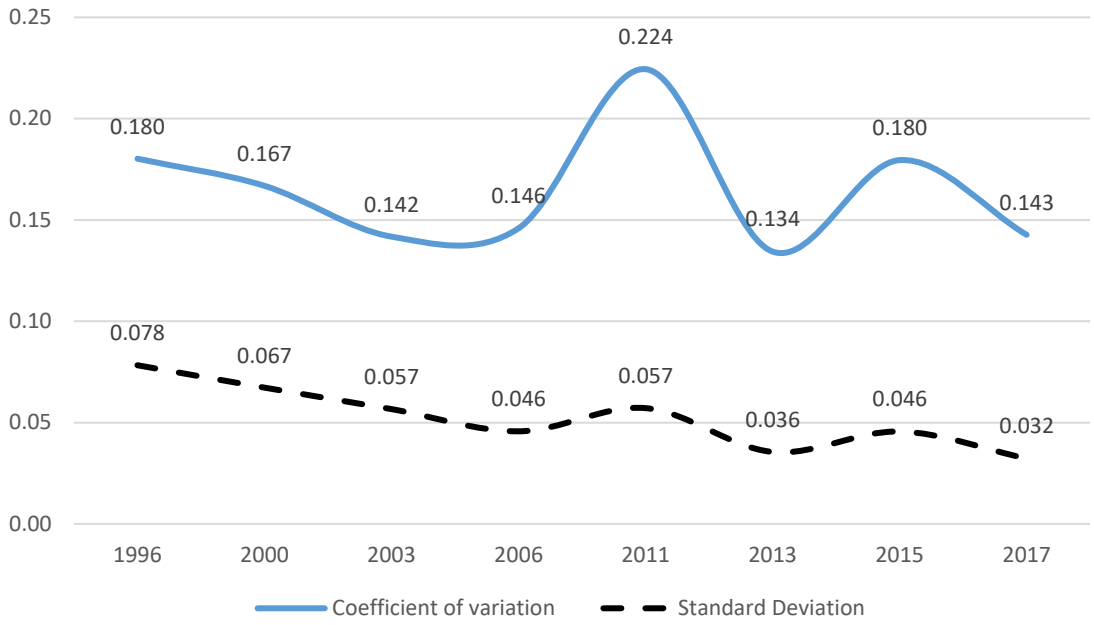
Period	Base	B coeficient	P>t	[95% Conf. Interval]	
1996-2000	1996	-11.3	0.28	-33.1	10.5
2000-2003	2000	-21.7	0.03	-40.8	-2.7
2003-2006	2003	-9.9	0.45	-37.6	17.7
2006-2011	2006	18.8	0.33	-21.5	59.1
2011-2013	2011	-104.3	0.00	-148.8	-59.8
2011-2015	2013	26.8	0.52	-62.7	116.3
2015-2017	2015	-70.6	0.04	-136.1	-5.2
1996-2017	1996	-6.3	0.02	-11.3	-1.4
2006-2017	2006	-3.5	0.42	-12.7	5.7
1996-2006	1996	-11.3	0.03	-21.0	-1.7

Source: Authors' own calculations with Casen household survey data.

[15] Note that due to data limitations, differences in costs of living between regions are not taken into account by this analysis. If these diverge then convergence might be overestimated. This study is correlational and therefore does not allow for the analysis of causal relationships.

The results of Sigma convergence illustrated in Figure 2 below show the same pattern over time. There is a relevant reduction in the dispersion indicators in the first decade (1996-2006) and a less noticeable change between 2006 and 2017. Sharp changes in the dispersion coincides with the economic performance of the country. In the first case (2011), the Great Recession reduced the national GDP by 1% in 2009 affecting mainly the construction, industry and fishing industries. Additionally, the 2010 earthquake had a detrimental and diverse impact across Chile's central and southern regions.

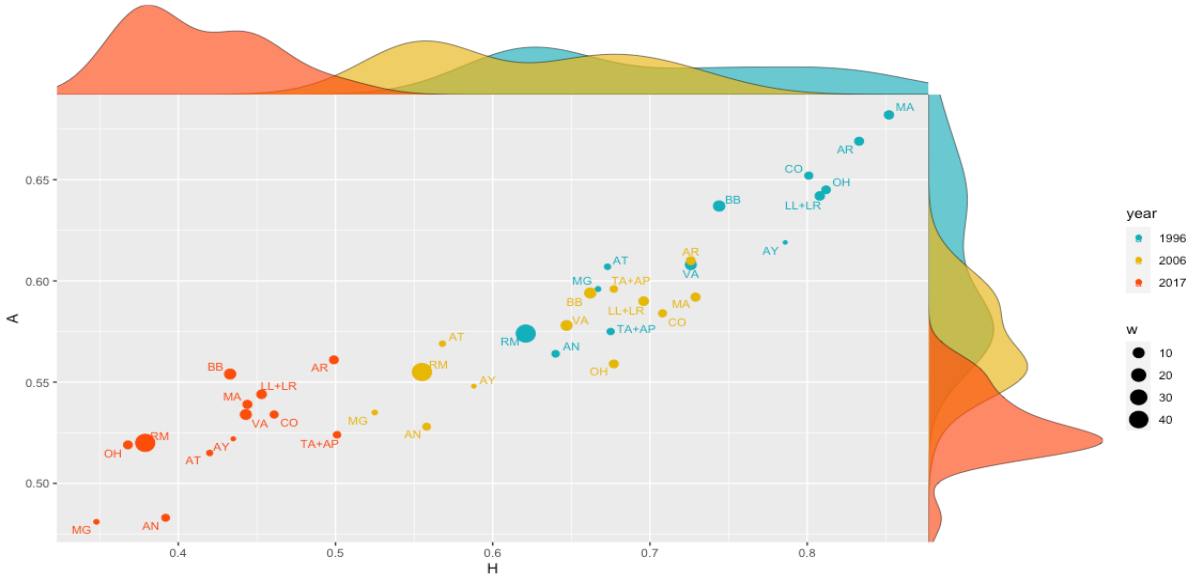
Figure 2. Sigma Convergence



Source: Authors' own calculations with Casen household survey data.

Decomposing the index by its main subcomponents (the H and A ratios) provides further insights into these developments. Figure 3 illustrates how the headcount ratio (H) and the intensity ratio (A) are related to each other in 1996, 2006 and 2017 in each region. It shows the percentage of workers with poor employment conditions (x-axis) and the intensity of the condition (y-axis) per region and year. The size of the bubbles reflects the number of workers per region, and the density plots show the weighted distribution of the indicators (H and A) in each year. Between 1996 and 2017, all regions show significant improvements in terms of their QoE, both in terms of its headcount ratio and intensity score. Most importantly, the worst-performing regions in 2017 have surpassed the best performing regions from prior years. In addition, the range of performance has shrunk by more than 20% over the same period. Finally, Figure 4 illustrates how heterogeneous the regional results are: some, like El Maule, have improved very significantly, while the regions in the extreme north have improved at a slower pace.

Figure 3. Changes over time of H and A



Source: Authors' own calculations with Casen household survey data.

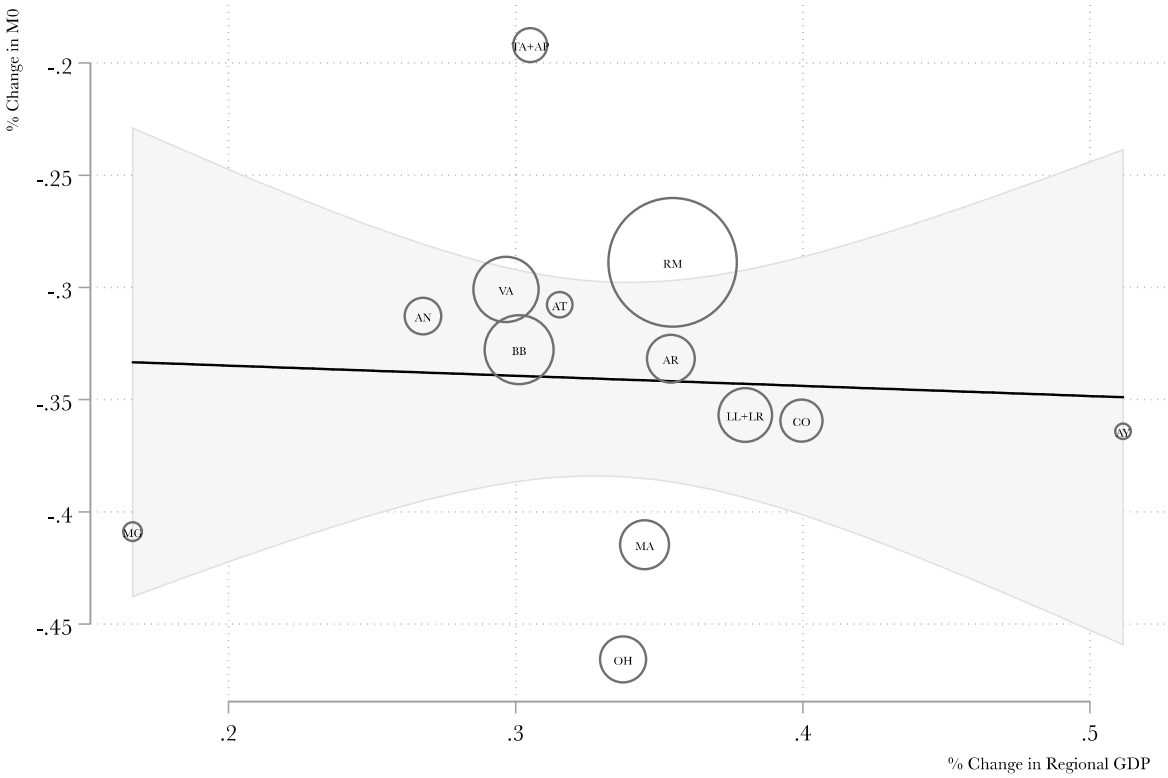
Figure 4 below plots the variation in Chile's regional GDP growth rates against the variation in the QoE deprivation change to illustrate how little they are related. Over the period studied, economic growth does not seem to explain changes in the QoE. Figure 4 summarises annual changes in QoE deprivation in relation to economic growth over the period analysed and illustrates that there are significant differences in terms of how regional growth has affected the QoE. For example, the regions O'Higgins and Arica Parinacota both grew at the same rate of 30%. But in O'Higgins the QoE index decreased by 32% while in Arica Parinacota it decreased by only 19%. Conversely, in the Magallanes region, economic growth was only 16.7% while QoE deprivation decreased by 41%. By contrast, economic growth in the Metropolitan Region was almost double that rate (35%), but QoE deprivation improved by much less (29%).

These results question the commonly held assumption that a trade-off exists between the QoE and the quantity of employment. This confirms initial results put forward by Sehnbruch et al. (2020), Apablaza et al. (2020), and Mendez et al. (2021) which also suggest a limited relationship between the quantity and quality of employment.

One key question that emerges from these results is what its policy implications are, especially as the results suggest that economic growth alone is not automatically linked to improvements in the QoE. To answer this question, Figures 5 and 6 show which dimensions impact the QoE Index result most. Put differently, they show which dimensions of employment policy makers should focus on to further improve QoE deprivation levels. When a dimension or variable contributes more to the result than its respective weighting in the index, this means that policy attention should be focused on this issue. Between 1996 and 2017, we can see that the contribution made by

deprivation in the income dimension has decreased significantly (from 36.3% to 29.5% at the national level), as has deprivation in the dimension excessive hours worked (down from 19.2% to 10.6%). The other three variables included in the index, have therefore increased in importance in terms of the impact they have on poor QoE. In particular, the lack of social security contributions and the occupational status contribute to the overall result of the indicator. This type of analysis is particularly useful for policy makers as they can see which component variables of the index are particularly problematic.

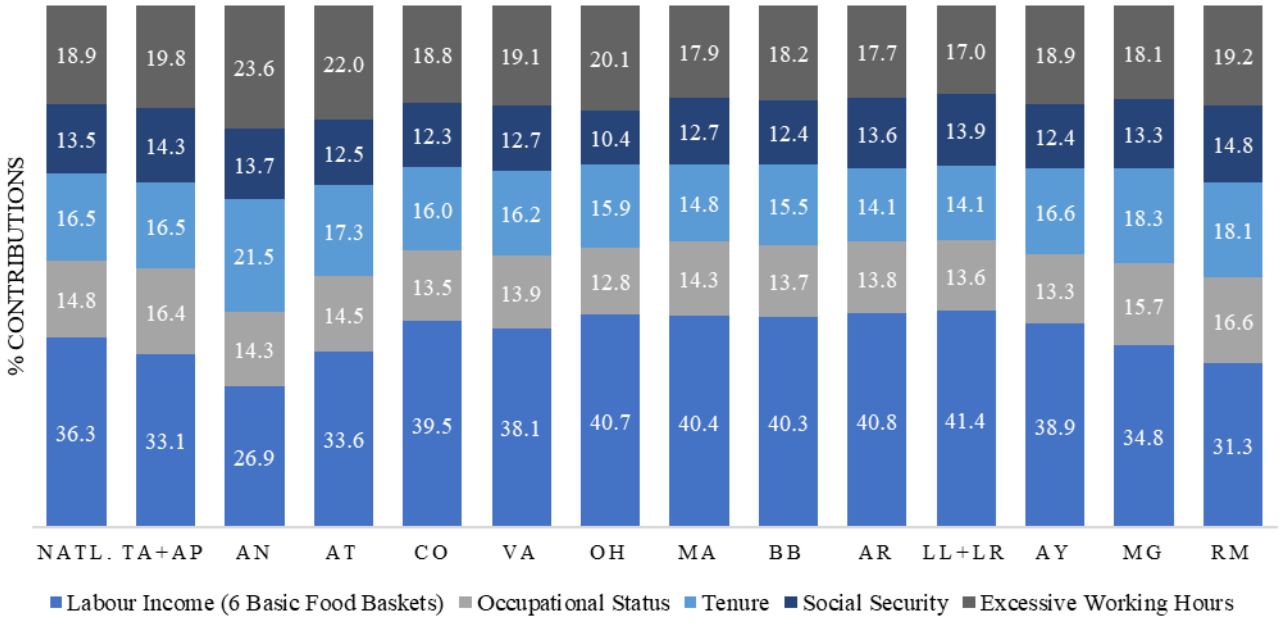
Figure 4. Elasticity Growth and Quality of Employment



Source: Authors' own calculations with Casen household survey data and National Institute of Statistics data for GDP data.

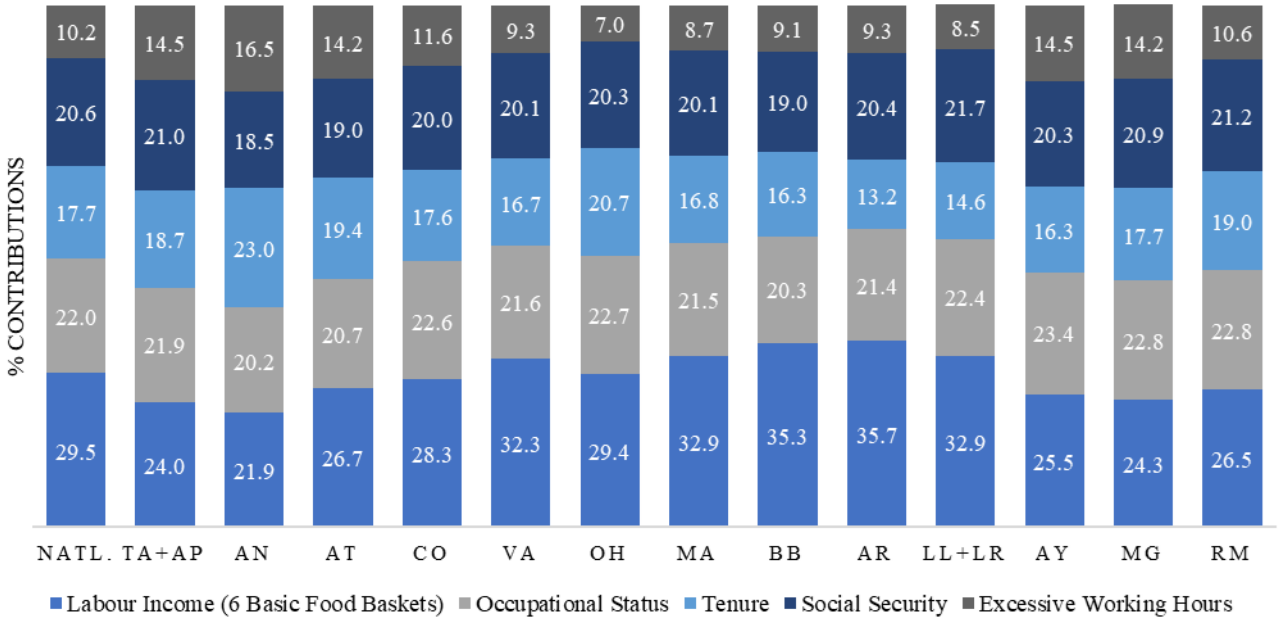
Figures 5 and 6 below show that this pattern is broadly repeated across Chile's regions, although some interesting differences emerge if we disaggregate this data. In 1996, the contribution of the income dimension was the most significant in all regions except the mining region of Antofagasta. By 2017, this has changed with the contribution of the income dimension diminishing in all regions. Only Bío-Bío and Araucanía maintain a high proportion of deprivation in this dimension. By contrast, the importance of the indicators occupational status, tenure and social security deprivation have increased significantly during the period, suggesting that public policy should prioritise these issues.

Figure 5. Percentage contribution to the QoE Index (M0) by region in 1996



Source: Authors' own calculations with Casen household survey data.

Figure 6. Percentage contribution to the QoE Index (M0) by region in 2017



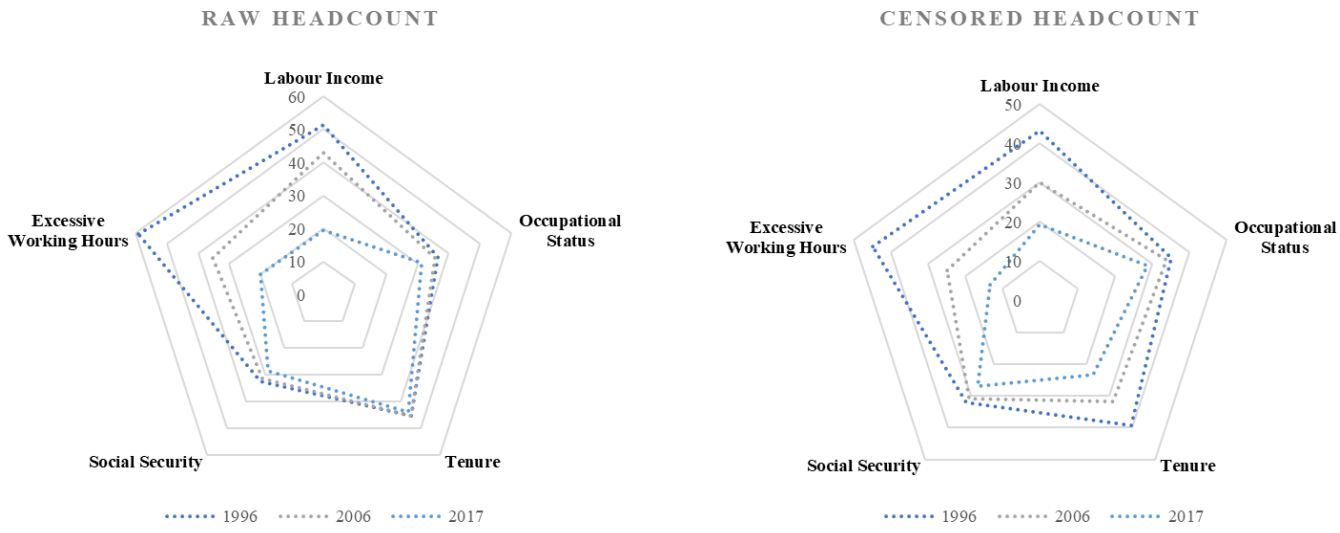
Source: Authors' own calculations with Casen household survey data.

In terms of contributions, the main components of the QoE index in 1996 were related to labour income and excessive working hours which together contributed more than 55% of the indicator. In 2017, labour income remains the most relevant but occupational status has significantly increased its relevance. Between 1996 and 2017,

the contribution of labor income and excessive working hours has fallen around 8 percentual points. These changes seem to be related to regulatory changes in the country mainly in terms of the reduction in the statutory working hours and increments in the official minimum wage. On the other hand, there is a significant increase in the contributions on the occupational status in the period from 14.8% to 22%.

However, a further key policy question emerges from this analysis: Are workers more deprived in a single dimension, or are they simultaneously deprived, and if so, which indicators most contribute to this deprivation?[16] Figure 7 shows a comparison between the raw and censored headcount ratios. Following Alkire and Foster (2011), the raw headcount shows which proportion of individuals in the labour force is deprived in a particular dimension (the H ratio). By contrast, the censored headcount only looks at deprived workers (as defined by this index) and examines which specific indicators most contribute to their deprivation. For policymakers, the most important variables that they should focus on are those that affect deprived workers the most, in this case occupational status of workers and whether they contribute to social security. This will have the biggest impact on the lives of the most vulnerable workers in Chile.

Figure 7. Raw and Censored Headcounts (%)



Source: Authors' own calculations with Casen household survey data.

One of the questions that emerges from the above analysis is what the impact of particular policies on QoE deprivation has been. The Shapley decompositions below (Figure 7) illustrate the impact that the minimum wage and working week regulation had in Chile.

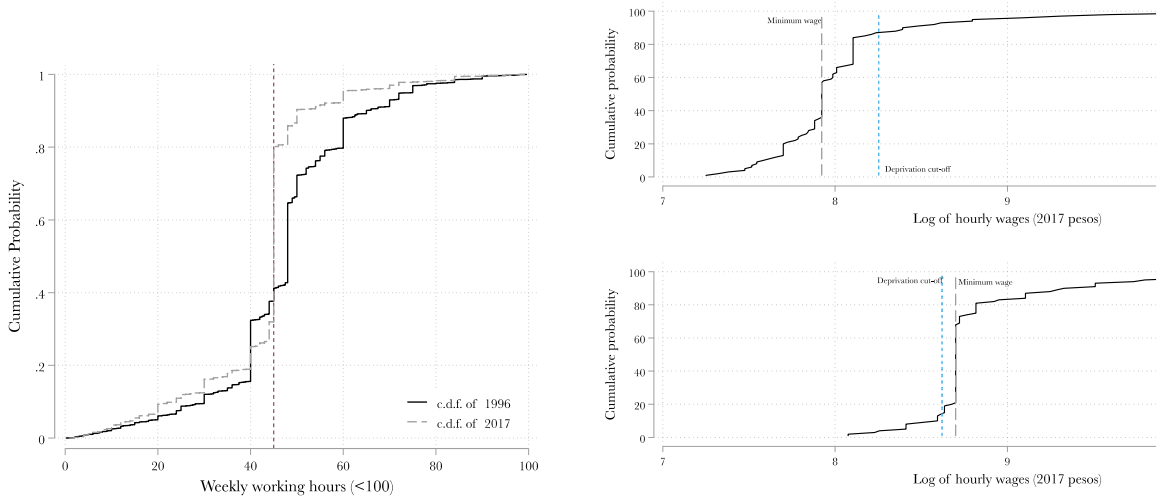
Deprivation in income and working hours have fallen unambiguously and significantly across all regions between 1996 and 2017. Shapley decompositions confirm the

[16] For results of censored headcounts by gender see Figure A-2 in the Appendix.

inference. In all regions the biggest improvements in QoE deprivation are related to changes in the working hours and income indicator. Furthermore, they usually represent twice the relevance of the other indicators. As mentioned before, legal changes have had a strong impact on this outcome, especially working hours and minimum wage regulation.

Figure 8 presents how these variables are distributed. In the first graph, the cumulative distribution of the number of hours in 1996 and 2017 are presented. The introduction of regulation that restricted the working week to 45 hours in 2001 reduced the mode of working hours: in 1996, around 40% of the population worked 45 hours or less. By 2017, that had increased to 80%.[17]

Figure 8. Cumulative distribution of working hours and wages



Source: Authors' own calculations with Casen household survey data.

In the second graph, the distribution of wages in 1996 and 2017 are presented. In both distributions, the minimum wage plays a crucial role in determining workers' income since a large fraction of jobs in both years pay the minimum wage and many are clustered around that level.[18] Therefore, if the minimum wage increases by more than inflation, the real income of a significant proportion of workers increases. In 1996, the value of the minimum wage was below the value of 6 foodbaskets, while by 2017, this relationship had become inverted. Put differently, a worker earning the minimum wage in 1996 would have automatically been considered as deprived in the income dimension in this index. By 2017, a minimum wage earner is not-deprived in that dimension.

[17] The before and after distribution of working hours prior and post the enactment of the law regulating working hours can be seen in Figure A-3 in the Appendix.
[18] To see kernel density distribution plots on real monthly wages and minimum wage for 1996, 2006 and 2017 see Figure A-4 in the Appendix.

5.2 Econometric Analysis

The regional analysis provides several insights that improve the understanding of the evolution of the QoE in Chile. However, the results also point to the question of whether there may be other factors aside from labour market policies, which may have contributed to the improvement of QoE across the board. Almost all socioeconomic indicators in Chile have improved substantially over the period studied (see Table 1). However, the expansion of education attainment merits particular attention as this has a direct impact on labour markets and the QoE. It is also important to consider all variables related to the QoE at the same time, to assess the true influence of each variable apart from the partial correlation that might exist between each individual variable and the QoE. In addition, this influence might vary over time.

The use of individual level data provides additional information on how the QoE is associated with different regional and socio-economic factors at different points in time. The analysis that follows focuses on the identification of individuals in terms of his/her QoE and not on the intensity of his/her condition. As discussed in section 4, Heckman probit selection models are used as the outcome variable (being QoE deprived or not) is only observable for a selected sample. The variables included in the model are regional categorical variables using the Metropolitan Region (RM) as the reference category as well as years of education. The other control variables included are sex, work experience, economic sector of employment, firm size and civil status.

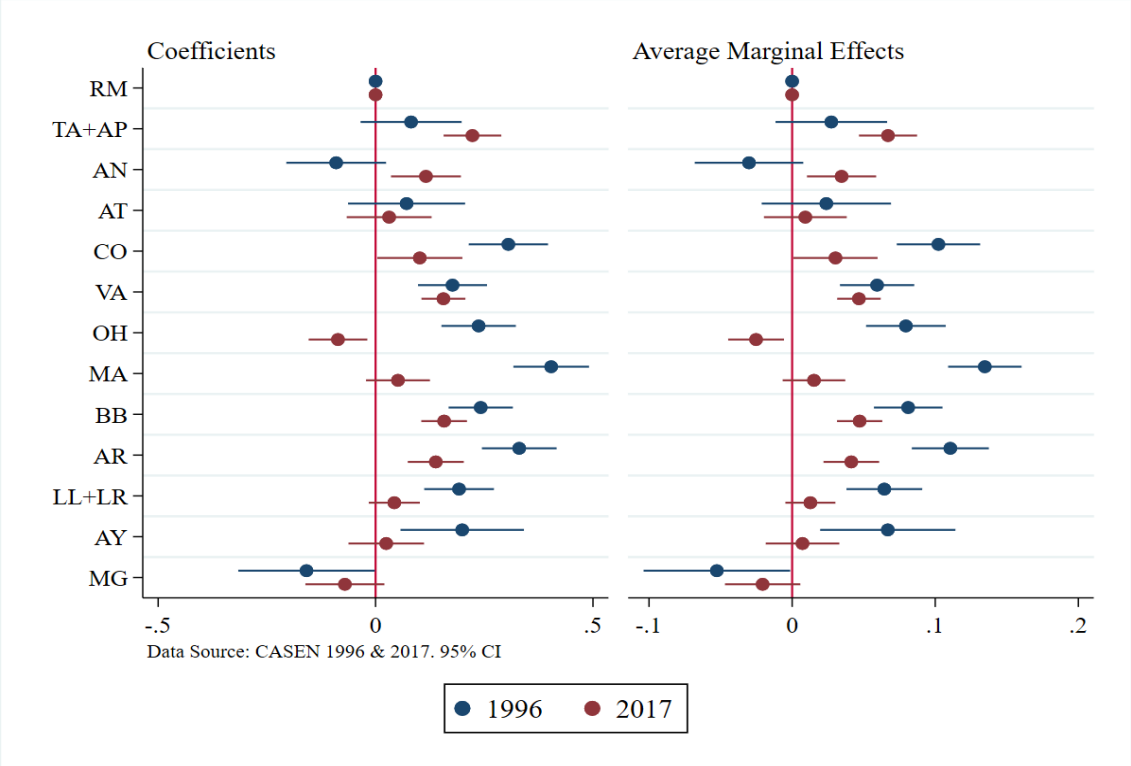
At the national level and controlling for the indicators mentioned above, the results are in line with the analysis presented in the previous section. Over time, the results show that on average a worker has a lower chance of being QoE deprived. By 2017, workers are around 20% less likely to be employed in a poor-quality job than in 1996. Figure A-1 in the Appendix shows the predictive margins for these results over time. In 1996, the evolution of the national marginal effects of 2000, 2003, 2006, 2011, 2013, 2015 and 2017 is significant ($p<0.01$). While the results for 2000 suggest a small deterioration of quality of employment in Chile, this trend is reverted through steady improvements from the year 2006 and onwards.

At the regional level, 9 of the 12 regions were statistically different than the Metropolitan Region in 1996; by 2017, only 7 were different. Furthermore, the probability of having worse QoE in 2017 is smaller in comparison to 1996 in all regions but two (Tarapaca/Arica/Parinacota and Antofagasta). In general, the results show that the regions are improving in employment quality and becoming more similar to the Metropolitan Region.

Figure 9 illustrates regional changes by comparing results for 1996 and 2017. The best performer is the O'Higgins region, with individuals on average experiencing a

significant decrease of the probability of having poor quality of employment between 1996 and 2017 relative to the Metropolitan Region. Next, Coquimbo, El Maule, Araucanía and Bío Bío present a reduction in the probability of poor quality of employment as well as a reduction in the gap between themselves and the RM. Atacama, Valparaíso, Los Lagos and Los Ríos and Aysén reduced their QoE deprivation, but did not reduce the gap between themselves and the RM, specifically when taking account of statistical differences between 1996 and 2017. For Tarapacá and Arica/Parinacota, Figure 9 shows that on average the QoE in the region seems to experience a statistically significant deterioration relative to the RM. For Magallanes, on average, its QoE level in 2017 became much more similar to the RM, while in 1996 it had been doing better. Finally, the worst performer is Antofagasta, which reverted its situation in 1996 to a positive probability of having bad quality of employment in 2017, in comparison to the RM.

Figure 9. Coefficients and Average Marginal Effects



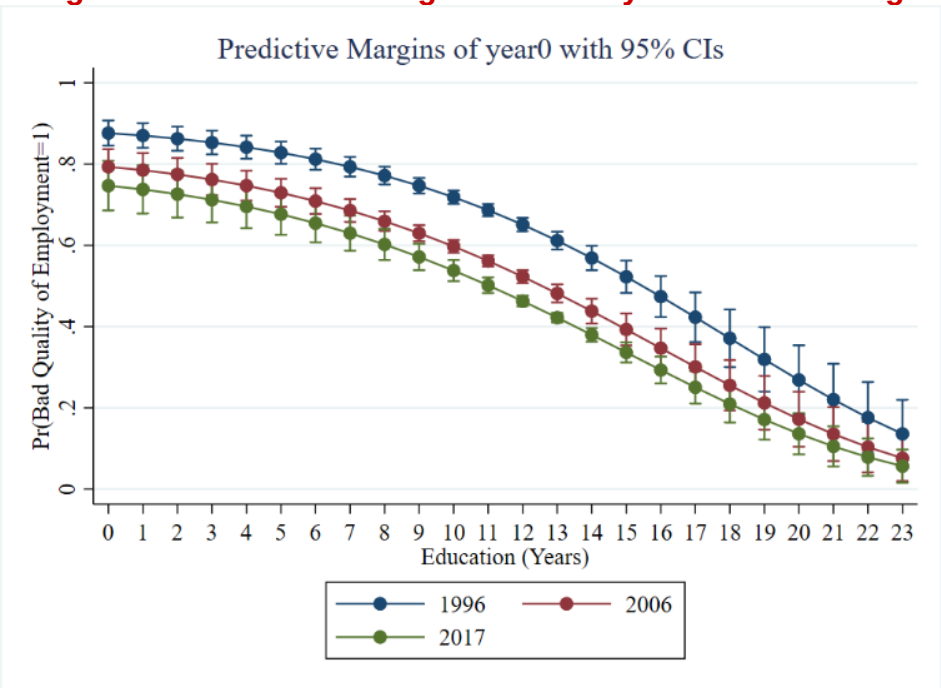
Source: Authors' own calculations with Casen household survey data.

In terms of the other variables studied, the results suggest that women have a higher chance of having poor-quality jobs compared with men, ceteris paribus. Moreover, the probability of poor QoE is similar when comparing marginal effects for 2017 and 1996. With regards to civil status, individuals who report having a partner are less likely to be QoE deprived; in 1996 -2.1% and in 2017 to -3.8%. Although, when considering sex and civil status together, on average women tend to have higher probabilities of having lower-quality jobs.

In terms of the size of firms, the results of the econometric analyses suggest that poor QoE is mainly concentrated in small and micro-sized firms as opposed to large firms. In particular, micro-enterprises have considerably lower chances of being in such an employment condition compared with workers in larger enterprises. This likelihood of deprivation of employees in micro-enterprises seems to increase substantially from 1996 to 2017. The results regarding economic sector show that bad QoE is related more so to individuals working in the primary sector, whilst individuals working in the secondary sector are not much different in terms of QoE compared to the Tertiary sector.

A crucial variable at the individual level is education. At the national level, average years of schooling of workers increased from 10.4 years of education to 13.3 over the period studied. Moreover, in 1996 50.5% of workers had completed secondary education, while this proportion increased to 72.8% in 2017. At the regional level, results tend to coincide with improvements in quality of employment. For instance, the five regions with larger expansions in education have shown 15 perceptual points stronger improvements in terms of quality of employment compared with those regions at the bottom of the distribution. Controlling for all other variables, one additional year of education reduces the probability of having poor quality employment by 3.2%. Figure 10 shows the impact of increases of years of education for 1996, 2006 and 2017. These results show that higher education levels have continuously decreased the likelihood of having bad QoE, regardless of which year we examine. Figure 10 shows that the distribution pattern of education is maintained over time.

Figure 10. Predictive margins base on years of schooling



Source: Authors' own calculations with Casen household survey data.

Education does have a further equalising effect, which relates to higher levels of education. In turn, these individuals have less probability of having bad quality of employment, although the premium education provides diminishes in terms of marginal effects for 2017 compared to 1996. The substantial expansion of secondary but mainly tertiary education which grew at least three times between 1996 and 2017 has provided incentives to the labour market to reduce the benefits of higher education.

To further understand the differences between results in 1996 and 2017, we estimate the multivariate decomposition for nonlinear responses using a probit model following Kitagawa-Oaxaca-Blinder-decomposition, as explained in section 4.3. The results of the decomposition analyses are presented in Table A-4 in the Appendix. The improvement (raw difference) in employment quality between 1996 and 2017 is 0.25. The change in employment quality between the CASEN 1996 and CASEN 2017 was mostly due to differences in coefficient effects (responses/effects, 65.7%). Meanwhile, differences in characteristics contributed to 34.3% of the change in employment quality. The later suggests that the observed improvement in endowments explains slightly more than a third of the improvement of QoE between 1996 and 2017, while a reduction of coefficients accounts for the remaining two thirds. Education had a large impact in QoE but its influence is reduced between 1996 and 2017. The same occurs with regional dummies, reinforcing the idea of convergence.

Table 6. Heckman Probit Regression Results for 1996 and 2017

Variable	Characteristic	1996				2017			
		β	SE	Marginal Effect	SE	β	SE	Marginal Effect	SE
Main									
Region	Reference: Metropolitan Region								
	TA+AP	0.082	(0.059)	0.027	(0.020)	0.223***	(0.034)	0.067***	(0.010)
	AN	-0.091	(0.059)	-0.030	(0.019)	0.116**	(0.041)	0.035**	(0.012)
	AT	0.071	(0.069)	0.024	(0.023)	0.031	(0.050)	0.009	(0.015)
	CO	0.305***	(0.047)	0.102***	(0.015)	0.102*	(0.050)	0.030*	(0.015)
	VA	0.177***	(0.040)	0.059***	(0.013)	0.156***	(0.026)	0.047***	(0.008)
	OH	0.237***	(0.044)	0.079***	(0.014)	-0.086*	(0.034)	-0.025*	(0.010)
	MA	0.404***	(0.044)	0.135***	(0.013)	0.052	(0.037)	0.015	(0.011)
	BB	0.242***	(0.038)	0.081***	(0.012)	0.158***	(0.027)	0.047***	(0.008)
	AR	0.330***	(0.044)	0.111***	(0.014)	0.138***	(0.033)	0.041***	(0.010)
	LL+LR	0.192***	(0.041)	0.064***	(0.014)	0.043	(0.030)	0.013	(0.009)
	AY	0.199**	(0.072)	0.067**	(0.024)	0.025	(0.044)	0.007	(0.013)
	MG	-0.159*	(0.080)	-0.053*	(0.026)	-0.071	(0.046)	-0.021	(0.013)
Education	Years of Education	0.017	(0.021)	-0.032***	(0.003)	-0.023	(0.012)	-0.019***	(0.001)
	(Years of Education)2	-0.006***	(0.001)			-0.002**	(0.001)		
Sex	Reference: Male								
	Female	0.076***	(0.023)	0.025**	(0.008)	0.080***	(0.015)	0.024***	(0.004)
Experience	Years of Experience	-0.049***	(0.005)	-0.007***	(0.000)	-0.053***	(0.003)	-0.004***	(0.000)
	(Years of Experience)2	0.000***	(0.000)			0.001***	(0.000)		
Size of Firm	Reference: Large								
	Micro	1.016***	(0.080)	0.355***	(0.023)	1.535***	(0.022)	0.536***	(0.007)
	Small	0.292***	(0.040)	0.099***	(0.013)	0.256***	(0.029)	0.079***	(0.009)
	Medium	0.090*	(0.042)	0.030*	(0.014)	0.043	(0.026)	0.012	(0.008)
Economic	Reference: Tertiary								
Sector	Primary	0.275***	(0.037)	0.091***	(0.011)	0.259***	(0.025)	0.078***	(0.008)
	Secondary	0.028	(0.027)	0.009	(0.009)	-0.031	(0.020)	-0.009	(0.006)
Partner	Reference: Does not report having a partner								
	With partner	-0.049	(0.027)	-0.016	(0.009)	-0.126***	(0.024)	-0.038***	(0.008)
	Constant	0.692**	(0.240)			0.551***	(0.120)		
Selection Equation									
Has children	Reference: No children								
	Has at least one child	0.172***	(0.019)			0.390***	(0.012)		
Education	Years of Education	0.044***	(0.002)			0.047***	(0.002)		
	Constant	-0.359***	(0.023)			-0.456***	(0.018)		
athrho		0.956***	(0.169)			-0.025	(0.081)		
Number of observations		71886		39280		121543		72071	
F		20.086				335.612			
rho		0.742				-0.025			

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' own calculations with Casen household survey data.

6. Conclusion and Discussion

The index presented in this paper constitutes the first attempt to analyse how QoE deprivation has evolved over time and across regions in a developing country by means of a single synthetic measure. It deepens the results presented by Sehnbruch et al. (2020) by showing how their methodology can be adapted to the circumstances of a particular country with unique characteristics. The results presented in this paper

lead to several important conclusions: foremost among them is the simple fact that a synthetic indicator is useful in showing how QoE changes over time and across regions, in particular which regions have improved more than others and to which extent. A comparison of regional dashboard indicators, as advocated by many experts in the job quality literature, would simply not allow for the same kind of analysis.

Second, the results presented show how useful this information can be to policymakers in terms of identifying the most vulnerable workers in a regional labour market, which is an essential first step to tailoring public policy to their needs. By incorporating indicators such as occupational status, tenure, and working hours in this measure, the index includes variables that are not normally considered by traditional measures of labour market functioning.

Third, this paper highlights important differences between regions with similar indicators, such as Antofagasta and O'Higgins (both with an M_0 of 0.19) but where different QoE dimensions contribute to this result (employment conditions in Antofagasta and income levels in O'Higgins). This is an important conclusion that again plays a vital role in informing regional policymakers. Similarly, the econometric analysis presented here allows for a granular analysis of specific groups of workers, such as younger or older workers, women, or less educated workers. Again, this is a useful analytical exercise that is crucial to targeting policy making efforts at the most vulnerable workers or at those dimensions of employment, which most contribute to this vulnerability.

Fourth, this paper indicates just how important regulatory changes are to improving the QoE for workers. Section 5.2. clearly illustrates the impact of minimum wage and working week regulation on QoE deprivation levels. This is to say that those dimensions of employment that have been re-regulated by the government have produced improved outcomes. This prompts the question of what would happen if policy makers targeted their efforts at ensuring that more workers contribute to social security or at improving job stability. National regulation of the minimum wage and of the working week have not only led to improved overall outcomes, but also to a significant degree of convergence over time, despite regional differences in natural resource endowments and Chile's lack of economic diversification beyond its traditional export sectors that rely on mining, agriculture and fishing.

In sum, this QoE deprivation index offers new insights into the subjects of job quality and regional labour markets. By demonstrating what this multi-dimensional measure can accomplish, it should foster the development of both further national and regional indicators of this type, and help to refocus policy debates that are still frequently stuck on traditional variables such as the unemployment rate or wage levels in countries where these indicators are of little use, either because they say little about the most precarious employment relationships in the labour market, or because income levels are universally low.

In addition, this paper points to important future research: this QoE index can be used to track workers' employment trajectories using either panel or administrative data. This would allow analysts to understand, whether and to what extent workers become trapped in poor quality jobs, and what active labour market policies could do to help them. With larger administrative datasets, these trajectories could also be analysed at the regional or local level.

In this context, the question of the definition of cut-off lines must also be raised. In this paper, an income cut-off of six food baskets was used as the paper covers a 21-year period. However, since then the minimum wage has increased significantly to the point where a six food baskets cut-off line seems like a low bar. A future index should therefore consider Chile's current labour market and raise this cut-off line to levels that better reflect current standards of living.

Finally, looking forwards, it is important to consider how this index can be used in times of an economic crisis produced by Covid-19, significantly and rapidly increasing numbers of intraregional migration and the irruption of the gig economy in developing countries. There is a risk that all three challenges will focus policy attention on the quantity of jobs created while the quality of these jobs is relegated to the backburner. This paper shows, however, that this would be a mistake. Indicators of job quality should be closely monitored in conjunction with the quantity of jobs as development of these two aspects may diverge significantly.

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Appendix

Table Error! No text of specified style in document.**-1. Samples**

Year	Employed Sample	Restricted Sample for Index*	Restricted Sample / Employed Sample
1996	47915	41577	87%
2000	86425	72598	84%
2003	92278	82276	89%
2006	102197	90458	89%
2011	116626	106184	91%
2013	88699	81036	91%
2015	110499	101113	92%
2017	92417	84009	91%

* Individuals with all variables available for indicators

Table Error! No text of specified style in document.**-2. Spearman correlations**

		Income	Tenure	Occupational Status	Social Security	Excessive Working Hours
1996	Income	1				
	Tenure	0.18	1			
	Occupational Status	0.2697	0.0561	1		
	Social Security	0.2651	0.0603	0.7051	1	
	Excessive Working Hours	0.0166	0.0136	-0.0812	-0.0894	1
2000	Income	1				
	Tenure	0.1767	1			
	Occupational Status	0.3307	0.0846	1		
	Social Security	0.329	0.0993	0.7586	1	
	Excessive Working Hours	-0.0809	0.014	-0.1598	-0.1592	1
2003	Income	1				
	Tenure	0.166	1			
	Occupational Status	0.3331	0.0709	1		
	Social Security	0.3271	0.0704	0.7524	1	
	Excessive Working Hours	-0.1225	0.0163	-0.1602	-0.1659	1
2006	Income	1				
	Tenure	0.0888	1			
	Occupational Status	0.3976	0.0207	1		
	Social Security	0.3958	0.0292	0.7636	1	
	Excessive Working Hours	-0.0482	-0.0551	0.0589	0.0433	1
2011	Income	1				
	Tenure	0.1711	1			
	Occupational Status	0.1428	-0.0012	1		
	Social Security	0.1603	0.0208	0.7247	1	
	Excessive Working Hours	-0.0581	-0.618	0.0572	0.401	.
2013	Income	1				
	Tenure	0.0741	1			
	Occupational Status	0.3928	-0.0092	1		
	Social Security	0.3865	0.0075	0.7234	1	
	Excessive Working Hours	-0.0655	-0.0681	0.0507	0.0339	1
2015	Income	1				
	Tenure	0.1023	1			
	Occupational Status	0.3539	0.0112	1		
	Social Security	0.3474	0.0232	0.7052	1	
	Excessive Working Hours	-0.0635	-0.0788	0.0871	0.0643	1
2017	Income	1				
	Tenure	0.0708	1			
	Occupational Status	0.4079	0.0043	1		
	Social Security	0.4005	0.0232	0.6902	1	
	Excessive Working Hours	-0.0623	-0.0807	0.0811	0.0584	1

Note: There is a strong relationship between OS and SS, however both are relevant for normative reasons as is explained in the Dimensions and Indicator section.

Figure Error! No text of specified style in document.**-1. Predictive Margins for Pooled Regression Results (All years)**

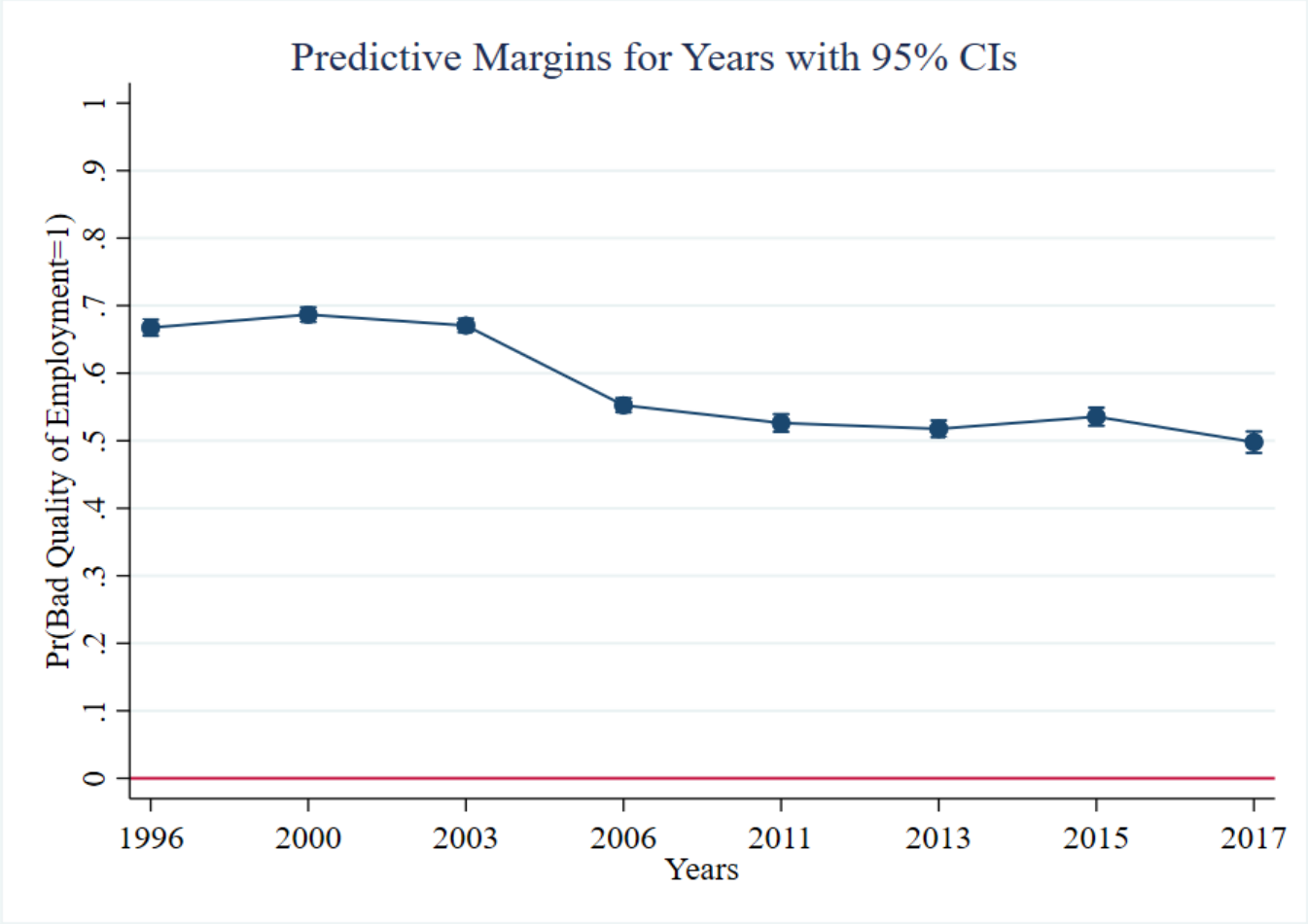


Table Error! No text of specified style in document.**-3. Heckman Probit: Pooled Regression**

Variable	Characteristic	Pooled Results			
		β	SE	Marginal Effect	SE
Main					
Year	Reference: 1996				
	2000	0.070***	(0.004)	0.019***	(0.001)
	2003	0.011	(0.007)	0.003	(0.002)
	2006	-0.392***	(0.006)	-0.115***	(0.002)
	2011	-0.479***	(0.020)	-0.141***	(0.007)
	2013	-0.507***	(0.019)	-0.150***	(0.007)
	2015	-0.448***	(0.022)	-0.132***	(0.007)
	2017	-0.572***	(0.027)	-0.170***	(0.009)
Region	Reference: Metropolitan Region				
	TA+AP	0.119	(0.074)	0.035	(0.022)
	AN	-0.040	(0.105)	-0.012	(0.031)
	AT	0.004	(0.055)	0.001	(0.016)
	CO	0.211***	(0.043)	0.062***	(0.012)
	VA	0.116***	(0.025)	0.034***	(0.007)
	OH	0.096*	(0.043)	0.028*	(0.013)
	MA	0.177***	(0.051)	0.052***	(0.015)
	BB	0.241***	(0.019)	0.070***	(0.005)
	AR	0.261***	(0.034)	0.076***	(0.009)
	LL+LR	0.117***	(0.028)	0.034***	(0.008)
	AY	-0.078	(0.070)	-0.023	(0.021)
	MG	-0.146**	(0.050)	-0.043**	(0.015)
Education	Years of Education	-0.030***	(0.009)	-0.032***	(0.003)
	(Years of Education)2	-0.004***	(0.001)		
Sex	Reference: Male				
	Female	0.199***	(0.040)	0.057***	(0.011)
Experience	Years of Experience	-0.042***	(0.003)	-0.005***	(0.001)
	(Years of Experience)2	0.000***	(0.000)		
Size of Firm	Reference: Large				
	Micro	1.326***	(0.040)	0.424***	(0.016)
	Small	0.300***	(0.023)	0.102***	(0.007)
	Medium	0.119***	(0.025)	0.040***	(0.008)
Economic Sector	Reference: Tertiary				
	Primary	0.226***	(0.036)	0.066***	(0.010)
	Secondary	0.075*	(0.029)	0.022**	(0.008)
Partner	Reference: Does not report having a partner				
	With partner	-0.136***	(0.013)	-0.040***	(0.004)
	Constant	1.201***	(0.109)		
Selection Equation					
Has children	Reference: No children				
	Has at least one child	0.277***	(0.034)		
Education	Years of Education	0.043***	(0.001)		
	Constant	-0.435***	(0.020)		
athrho		0.078**	(0.026)		
Number of observations		1065685		598207	
rho		0.078			

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Note: Table A-3 presents complete results for the pooled Heckman Probit related to Figure A-1.

Table Error! No text of specified style in document.**-4. Decomposition Analysis**

High outcome group: Year=2017 **Low outcome group: Year=1996**	**Estimate**	**Prob.**	**Standard Error**	**Percent**
Explained Component: due to difference in endowments or characteristics	-0.086	0.000	0.002	34.315
Unexplained Component: Coefficients effects	-0.165	0.000	0.005	65.685
Raw difference	-0.252	0.000	0.004	
Due to difference in characteristics (selected variables)				
TA+AP	0.000	0.000	0.000	0.047
AN	0.000	0.002	0.000	0.010
AT	0.000	0.560	0.000	0.006
CO	0.000	0.006	0.000	-0.008
VA	0.000	0.000	0.000	-0.053
OH	0.000	0.001	0.000	0.049
MA	0.000	0.074	0.000	0.058
BB	0.000	0.000	0.000	0.063
AR	0.000	0.000	0.000	0.054
LL+LR	0.000	0.164	0.000	-0.016
AY	0.000	0.677	0.000	-0.001
MG	0.000	0.028	0.000	-0.010
Education (Years)	-0.044	0.000	0.002	17.484
Due to difference in coefficients (selected variables)				
TA+AP	0.001	0.353	0.001	-0.292
AN	-0.001	0.124	0.000	0.288
AT	-0.004	0.000	0.001	1.729
CO	-0.005	0.037	0.002	2.027
VA	-0.007	0.000	0.001	2.840
OH	-0.010	0.000	0.002	4.009
MA	-0.008	0.002	0.003	3.107
BB	-0.006	0.000	0.001	2.426
AR	-0.006	0.000	0.002	2.308
LL+LR	-0.001	0.001	0.000	0.237
AY	0.000	0.970	0.000	0.005
MG	-0.016	0.102	0.010	6.290
Education (Years)	0.261	0.000	0.018	-103.500

Note: controlled for sex, experience, firm size, economic sector, and civil status.

Figure Error! No text of specified style in document.**-2. Male and female censored headcounts (%)**

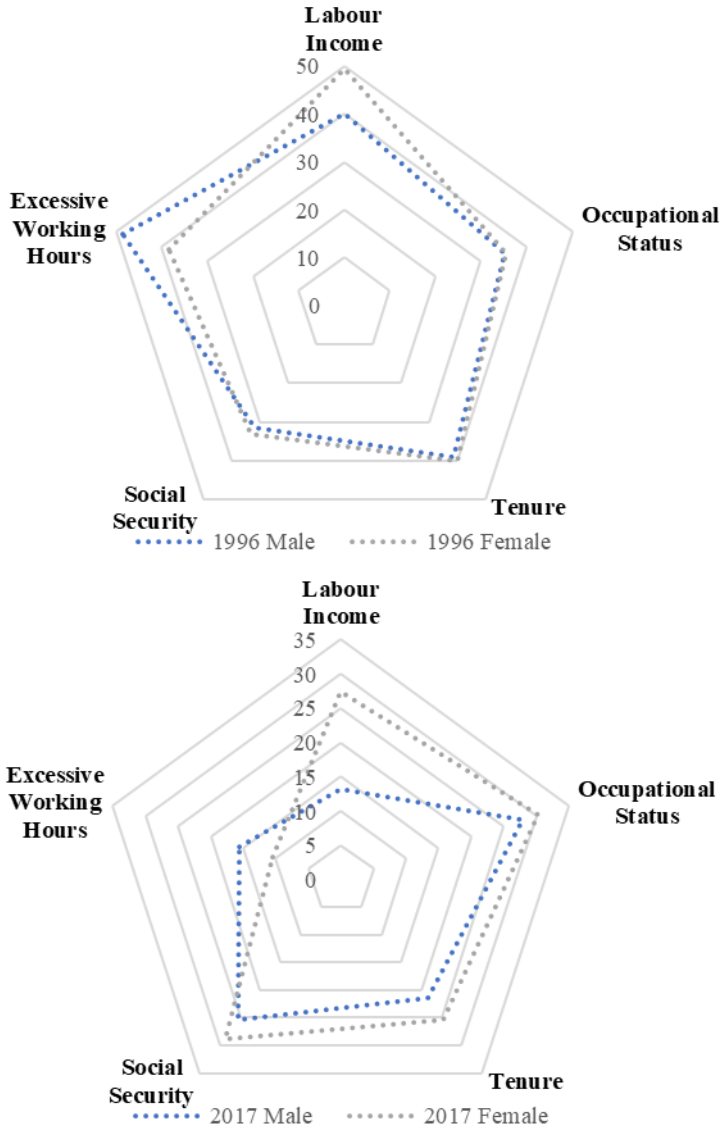
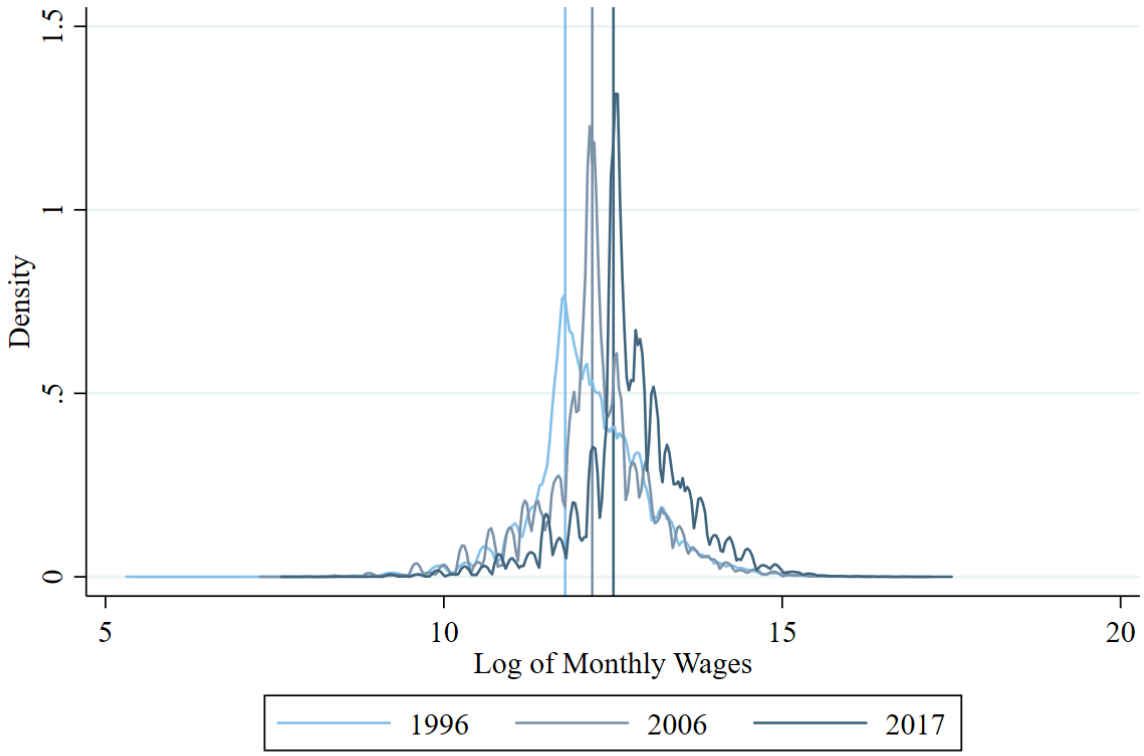
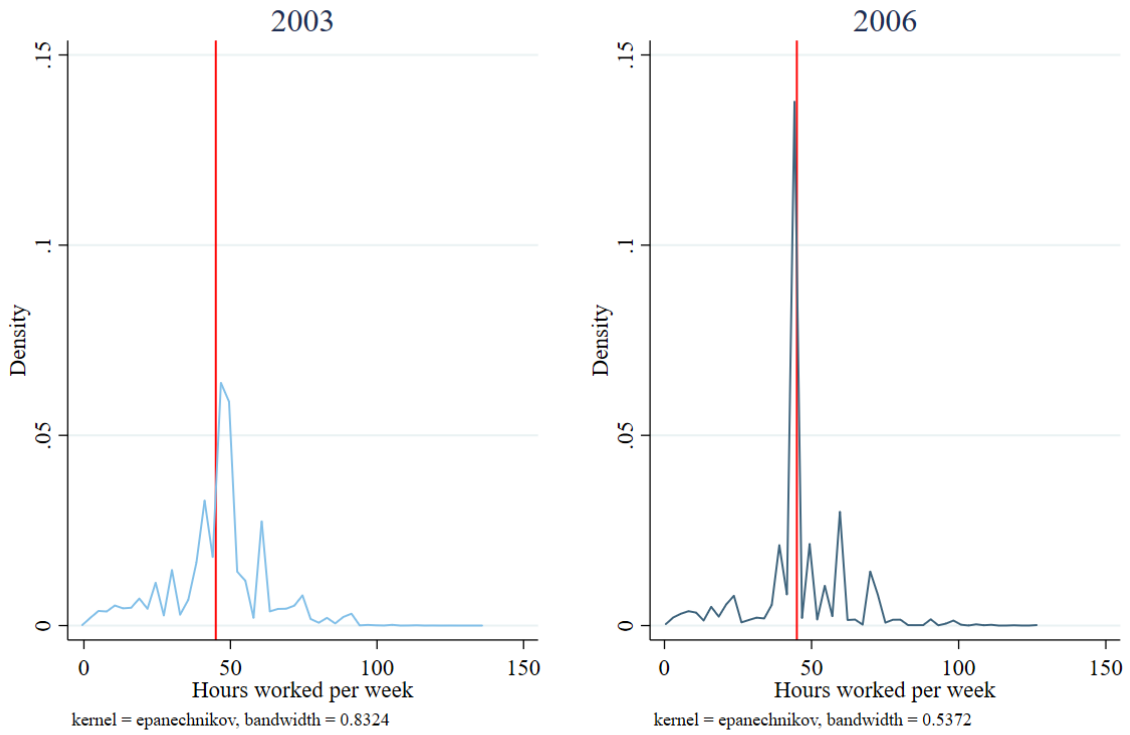


Figure Error! No text of specified style in document.**-3. Distribution of Real Monthly Wages and Minimum Wage**



Note: For working population between ages of 18 and 65 (CASEN 1996, 2006 & 2017) - Density plots. Vertical line refers to minimum wage for each year.

Figure Error! No text of specified style in document.**-4. Distribution of Hours Worked and Legal Working Hours Regulation**



Note: For working population between ages of 18 and 65 (CASEN 2003 & 2006)
Vertical red line in 2003 represents 48 hours, in 2006 it represents 45 hours.