INEQUALITIES IN THE REGIONAL DISTRIBUTION OF EMPLOYMENT INSURANCE BENEFITS IN CANADA

by

Déla Y. Hoyi

3391010

Department of Economics of the University of Ottawa
in partial fulfillment of the requirements of the M.A. Degree
Supervisor: Professor Miles Corak

ECO 7997

December 2009

University of Ottawa
Ottawa, Ontario

ABSTRACT

Employment insurance (EI) has been an important feature of Canada's income security system since 1940. The program has evolved over the years to adjust to changes in the composition of the, not to mention political pressure, labour force and economic activity. This paper analyzes the inequalities in the regional distribution of EI benefits over the period 1966-2008. One of the major contributions of this research is the development of an indicator of benefit inequality to measure inequality in the distribution of benefit weeks paid to the labour force in a year. On average, the Gini ranked between 0.26 and 0.34 for EI regular benefits paid to the labour force pre-1997 and between 0.28 and 0.32 for total EI benefits paid to the labour force since 1997. The results suggest both a higher level of inequality and a higher variance in the distribution of total EI benefit weeks paid by province, compared to that of EI regular benefit weeks. The results also reflect the evolution of the EI program's "generosity" over time. The Theil coefficient estimates ranged between 0.17 and 0.24 over the period from 1966-2008 and suggested similar conclusions about the level of benefit inequality before and after 1997. Regression results after controlling for various program parameters and labour force characteristics suggest that the spread in the entrance requirement (VER) entitling for benefits is a major contributor to the variation of the Gini over time. It was estimated that benefit inequality increases by 0.29 when the spread in work intensity entitling for EI benefits increases by one percentage point. These findings suggest that in the policy discussion on the relevance of the regional differentiation in the EI program, a stronger emphasis should be placed on the spread of the VER.

ACKNOWLEDGEMENTS

I would like to thank Mireille Laroche at the Department of Human Resources and Skills Development for an idea that informed part of this major paper.

I would also like to thank Miles Corak for agreeing to be my supervisor for this major paper. His help was invaluable – from the original idea of the research, he defined a project doable in the prescribed timeframe and provided frequent and insightful comments throughout the project. I am also thankful to the second evaluator – David Gray – for his time and additional comments.

Finally, I would like to express my gratitude to my family and friends – especially to my parents Daniel and Yawa for the opportunities and the support they provided and simply always believing in us.

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I. INTRODUCTION

In Canada, the Employment Insurance (EI) program, or Unemployment Insurance (UI) as it was called up to 1996, is an important feature of the income security system.[1] The program was introduced after the Great Depression, and the economic environment of the 1930s revealed that the local and provincial governments had neither the jurisdiction nor capacity necessary for proper income redistribution and social programs to deal with the unemployed. The program has provided temporary income replacement for workers when they become involuntary unemployed since 1940. It offers two types of benefits: *regular benefits* for workers who lose their jobs and *special benefits* for workers who become unemployed for sickness and family-related reasons such as parenthood (maternity and parental), sickness and compassionate care. These benefits are defined in Part I of the *EI Act*.

This paper is concerned with EI regular benefits. Since its creation, there have been numerous changes to the EI regular benefit program. The first major change was the introduction of regional differentiation in the 1970s. This was done to recognize the fact that not all areas of the country have equal employment opportunities, so the goal was to ensure that people who live in areas of high unemployment receive adequate support from the EI program. To suit this purpose, the country was divided into economic regions that have similar labour market conditions. The key determinant in setting up the regional

[1] The paper uses "EI" to refer alternatively to the UI or EI program in general. The content of the discussion, such as dates, informs the reader whether the specific discussion refers to either UI or EI. The paper will prefer the term "UI" when the discussion refers to criteria of the program that were specific to the UI-era of the program.

boundaries is the local unemployment rate. Over the following years, the number of EI economic regions varied from 16 in 1971 to 58 regions since 2000. Since 1978, workers in different areas of Canada face different entrance requirements to the EI program and a varying benefit structure linked to the unemployment rate in their region of residence. Other major changes include the move from an entrance requirement structure based on work-*weeks* to work-*hours* to determine benefit eligibility since 1996.

The purpose of this paper is to discuss how the regional differentiation in Canada's EI program influenced equality of access to benefits in terms of EI benefit weeks paid to the individuals. Essentially, the paper tries to analyze how the changes in the geographical partition of the country over time for the purpose of the EI program influenced the inequality of benefit weeks paid. The analysis includes both the changes in the number of EI regions and the changes in the entrance requirements entitling for benefits. It is important to note that the analysis, as presented, is not about inequality net of premiums paid but only in the benefits paid to individuals. The paper is therefore not a full look at the inequality of the EI program because it does not take the premiums paid into account.

The proposed research is relevant for at least two reasons. The first is that the last major changes to the EI economic boundaries date back to the mid-1990s, and recent EI boundaries reviews did not find the need to modify them. Many of the changes to EI after 1990 were introduced to reduce the costs of the program and create incentives to encourage stronger labour force attachments. The second reason for the relevance of the current paper is that some recent discussions have suggested that the EI program revert to a uniform entrance requirement or one region as before 1971. In June 2009, the federal government and the opposition party agreed to form an EI Working Group that would

analyze options for EI reform including a uniform 360-hour entrance requirement for all workers in Canada proposed by the Liberal opposition. Though the joint working group did not come to a mutual agreement for changes to EI, discussions of an EI reform including, a uniform entrance requirement, remain vivid in the ranks of provincial and national stakeholders and major economic think tanks.[2] Given that an income security system has multiple targeted programs, there may exist program interactions between EI Part I and EI Part II – Active Employment Measures, or within EI Part I benefits (regular and special benefits) that could influence the functioning and impact of the EI regular benefit program. The present paper does not consider such interactions.

The analysis covers the period from 1966 to 2008, encompassing all the major changes to the EI program since 1971. Over that period, the composition of the labour market also changed. The proportion of women in the labour force increased from lows of 30% in 1968 to about 47% in 2008. Part-time work in total employment also doubled, from less than 10% in the late 1960s to a level of around 20% since the 1990s. Such changes in the labour market partly influenced the shaping of the EI program over time. For example, when the 1996 *EI Act* made employment insurable from the first dollar earned, close to half a million part-time workers became insured for the first time.[3]

The period of analysis also covers times of sustained economic growth as well as recessions. The Canadian economy was booming in the 1960s and 1970s. Apart from the 1970s recessions, two major recessions particularly stand out as they proved a test of the responsiveness of the program in the early 1980s, and coincided with major program

[2] An example of current discussion is this recent report by the Canadian Chamber of Commerce published in July 2009, "Reforming Canada's Employment Insurance (EI) Program".

[3] Human Resources Development Canada (HRDC, 1995b).

changes introduced in the early 1990s. In addition, the current recession which started in 2008 is partly captured in the data.

One contribution of this paper has been to develop an indicator of benefit inequality based on the Gini coefficient. Our indicator measures the inequality in benefit weeks paid to the labour force using the provinces as the units of analysis. Data on benefit weeks paid included *total* EI Part I benefit weeks paid from 1966 to 1996, and EI *regular* benefit weeks paid from 1997 to 2008. We estimate that inequality in access to EI benefit weeks varied between a low of 0.26 in the late 1960s and a high of 0.34 around 1980, to settle at about 0.30 in 2008. Historically, inequality among *total* EI benefit weeks paid to the labour force is found to be relatively higher than inequality among EI *regular* benefit weeks paid to the labour force since 1997.

When we control for different program factors and labour force characteristics that could influence the level of benefit inequality, our results suggest that the average size of the EI regions, as measured by the number of individuals in the labour force divided by the number of regions, is a relatively small factor in determining the level of inequality. On average, a one percent decrease in the number of individuals in the labour force of a given economic region decreases benefit inequality at the national level by less than 1 percentage point with a 95% confidence level.

The findings suggest that while dividing the country into economic regions – each consisting of relatively homogenous labour markets conditions within – may have helped to lower benefit inequality overall, the effect seems small. In addition, the challenges that exist in obtaining accurate unemployment rate statistics for smaller geographical areas suggest there is a limit to the number of EI regions that could be implemented. This factor is important because one must have accurate labour market statistics to deliver the EI

program. The findings also suggest that the variable entrance requirement (VER) increased inequality in benefit weeks paid to the labour force, ceteris paribus. We thus conclude that the policy discussion on the relevance of the regional differentiation in the EI program should revolve less around the number of EI regions to implement but include factors such as the spread of the VER.

The paper is organized as follows. Section II provides an overview of the evolution of and the process for reviewing the EI economic boundaries in Canada. Section III describes the EI program's benefit eligibility and entitlement structure. Section IV attempts a framework for analyzing inequality in the regional distribution of EI benefit weeks. Section V discusses the proposed measure of inequality in EI benefit weeks paid. The paper ends with an empirical regression of the benefit inequality measure in Section VI and conclusions in Section VII.

II. EI ECONOMIC BOUNDARIES

A. Establishing and Reviewing the Regional Boundaries

The EI regional boundaries are based on geographical units established or used by Statistics Canada. These geographical units are defined to reflect groupings of areas with similar labour market characteristics. Areas that experience similar unemployment rates are set to define homogeneous labour market conditions. Additional considerations in determining boundaries include that they should reflect provincial borders and Statistics Canada boundaries, and that there are sufficient labour force sizes to allow accurate monthly estimates of regional unemployment rates.

Also, since 1990, clear attention is being given to the rural/urban split when establishing economic regions. Census metropolitan areas (CMAs) and census divisions (CDs) as defined by the Geography Division of Statistics Canada are key units for the structure of economic regions. The CMAs represent roughly contained areas in terms of the labour market around a major core urban core. The urban core must have a population of at least 100,000 individuals. The CDs correspond to counties, regional districts, regional municipalities and other types of provincially legislated areas. When provincial law did not provide for such administrative areas, like in Newfoundland, Manitoba, Saskatchewan and Alberta, Statistics Canada created the CDs in cooperation with these provinces for statistical purposes.

For these reasons, urban EI regions are essentially defined by CMA boundaries. A rural EI region corresponds to a grouping of adjacent CDs with comparable labour market characteristics. The key determinant of the regional boundaries is the unemployment rate

estimated from Labour Force Survey (LFS). Statistics Canada publishes the regional unemployment rate every month following the release of the LFS estimates using the most recent three-month data from the Labour Force Survey.

The Review Process

Since the introduction of the *UI Act* of 1990, the *Canada Employment Insurance Commission* (CEIC) is required, per section 54(w) of the act, to review the EI regional boundaries at least once every five years to determine if "it is appropriate to make changes". The goal is to ensure that people who live in areas of high unemployment get adequate help from the EI program. The CEIC is the head of the EI Program and is composed of four members. Two commissioners represent the workers and employers for terms of up to five years. The Deputy Minister and Associate Deputy Minister of the Department of Human Resources and Skills Development (HRSD) are the other two members and represent the government. The EI program is administered by the HRSD staff in the regional employment centres.

Every five years, the CEIC undertakes an EI regional boundaries review with two possible choices. The first is that there are no proposed changes to the boundaries. The second entails that an extensive review be considered to modify regional boundaries, and where necessary to make the EI program more responsive to changes in labour market conditions. During the regional boundaries review process, modifications to the boundaries of an EI economic region are considered when labour market conditions in the region have so changed that the previous boundaries delimitations become no longer appropriate. The EI region boundaries are generally changed to "allow a fairer determination of benefits paid to claimants and enhance the UI program's ability to be

more sensitive to regional disparities in Canadian labour markets".[4] There are consultations with Statistics Canada and with HRSDC regional and local economists throughout the review process. Previously expressed comments by local citizens and their elected representatives are also taken into account.

Depending on the conclusions of the EI boundaries review, the HRSD regional offices are provided with detailed descriptions of the new regions. The automated search tools that allow staff and individuals to determine the EI region to which a claimant belongs based on their place of residence are also updated. In addition, whenever a claimant lives so close to the boundaries of more than one economic region that it cannot be determined with certainty in which region s/he resides, section 17(2) of the *EI Regulations* establishes that the economic region of highest unemployment shall apply.[5]

Once new economic regions come into effect, they become the basis for determining the unemployment rate of the labour market area in which individual EI claimants reside. The unemployment rates in turn determine the minimum amount of work in order to qualify for EI as well as the number of weeks of benefits the individual can potentially receive during their benefit claim.

Over time, changes were made to the EI regions boundaries in order "to reflect regional employment conditions [*and to*] ensure an equitable treatment of claimants and greater fairness".[6] Current economic regions boundaries are based on 1996 census data and were implemented in 2000 except in two specific EI regions where changing the

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[4] HRDC (1995b), p. 168.

[5] EI Regulations, section 17(2), version current as of January 2007.

[6] Government of Canada, 18 February 2000.

economic regions had a greater impact than expected. The 2000 quinquennial review was based on detailed labour market data from the 1996 census and up-to-date labour market information available. All the labour market information had been analyzed to ensure that proposed EI economic regions represented homogeneous labour markets.

For two EI regions, Madawaska–Charlotte in New Brunswick, and Lower St. Lawrence and North Shore in Quebec, transitional measures were adopted to soften the negative impact of changing the boundaries. These measures have the effect of applying a higher unemployment rate for claims than would have been the case under the new boundaries and thus allow claimants to qualify for EI with a lower entrance requirement and receive benefits for a longer period. These transitional measures were subsequently extended many times, on the grounds that the negative impacts of applying the current regional unemployment rate resulting from the boundaries change persisted.

The latest EI regional boundaries review, which was started in 2005 and concluded in 2008, suggested that no changes be made to the EI economic boundaries. On September 5, 2008, the federal government confirmed the EI regional boundaries will remain the same as established by the previous boundaries review. The transitional measures in Madawaska–Charlotte and Lower St. Lawrence and North Shore were further extended with a final expiration date of April 10, 2010. The next EI regional boundaries review is expected to be conducted in 2013.[7]

B. Evolution of Regional Boundaries

Prior to 1971, the UI system in Canada treated all workers the same, regardless of where they lived, with respect to the minimum amount of work required to claim EI

[7] Government of Canada, 5 September 2008.

unemployment (or regular) benefits and the maximum number of weeks of benefits the individual would receive – the entitlement maximum. In July 1971, the country was divided into 16 UI economic regions of homogeneous labour market conditions (see Figure 1). The legislation essentially created EI regions from east to west in the southern part of the country. The reader can find a name list of the EI regions between 1971 and 2008 in Appendix A. The change introduced regional differentiation in the number of UI benefit weeks paid for a claim to recognize the fact that not all areas of the country have equal employment opportunities.

On November 12, 1978, Bill C-27 increased the number of UI economic regions from 16 to 48 UI economic regions (see Figure 2), following a *Comprehensive Review* of the UI program conducted in 1977. The Review had concluded that there were areas of high unemployment that were not eligible for the regional extended benefits, while there were other areas of low unemployment that were eligible for those benefits. It thus suggested a need for changes in the boundaries and the number of EI regions. The result was a further partition of the southern part of the country. The legislation also sectioned off the territories in the north from the northern areas of the provinces to form one EI region. Through the 1980s, there were only minor changes to the regional boundaries in New Brunswick, Nova Scotia, Quebec and Ontario.

Figure 1: Canada and its 16 UI economic regions in 1971

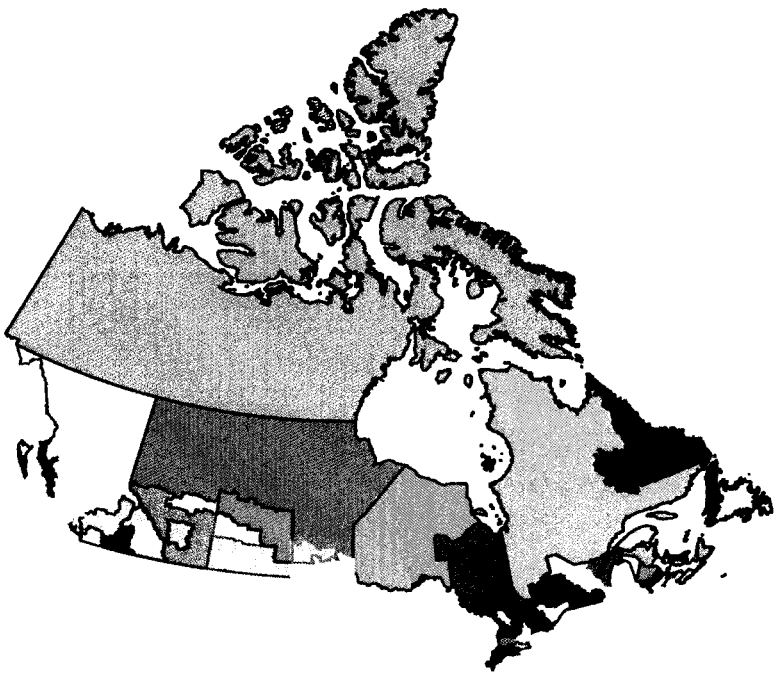

Figure 2: Canada and its 48 UI economic regions in 1978

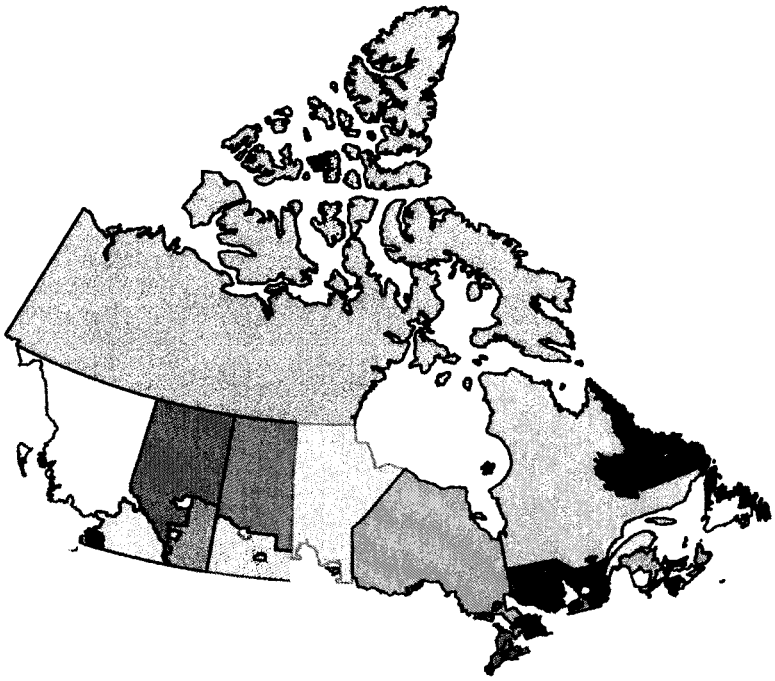

Figure 3: Canada and its 62 UI economic regions in 1990

On November 18, 1990, Bill C-21 raised the number to 62 UI economic regions following a major review of the regional boundaries (see Figure 3). As discussed, new strict criteria for the creation of boundaries were introduced. The new EI regions respected the urban/rural split of geographical areas and the provincial boundaries while ensuring that each economic region was roughly self-contained in terms of the labour market. On June 30, 1996, the first quinquennial review led to reducing the number of regions to 54 (see Figure 4).

The current 58 EI regional boundaries were implemented on July 9, 2000, following the conclusion that the changes would properly adjust the sensitivity of the EI program to regional economic differences, especially for the few areas which were experiencing continued and relatively high unemployment. The economic regions in all provinces were amended, except in Newfoundland, Prince Edward Island and Manitoba.

A key change was the split of the territories (Nunavut, the Northwest Territories and the Yukon) from one economic region to three economic regions (Figure 5).

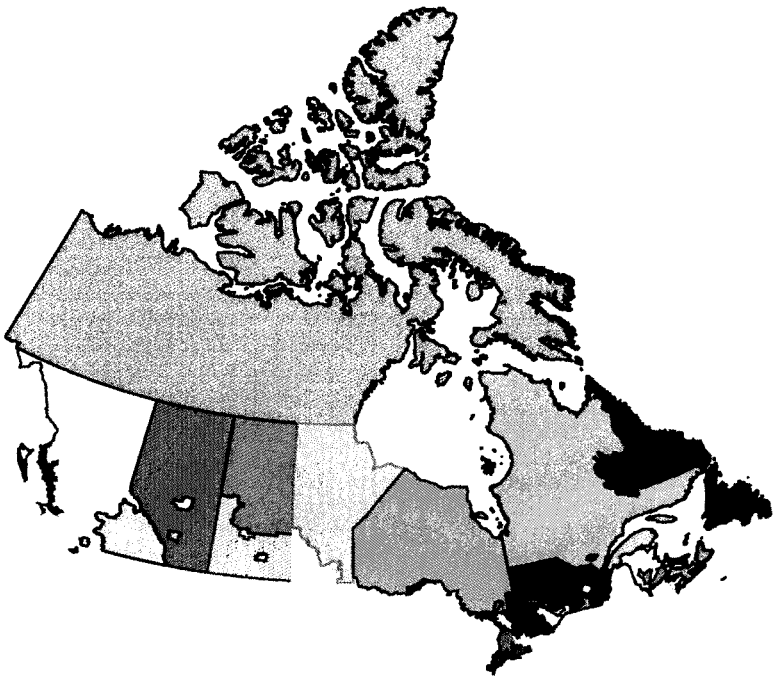

Figure 4: Canada and its 54 EI economic regions in 1996

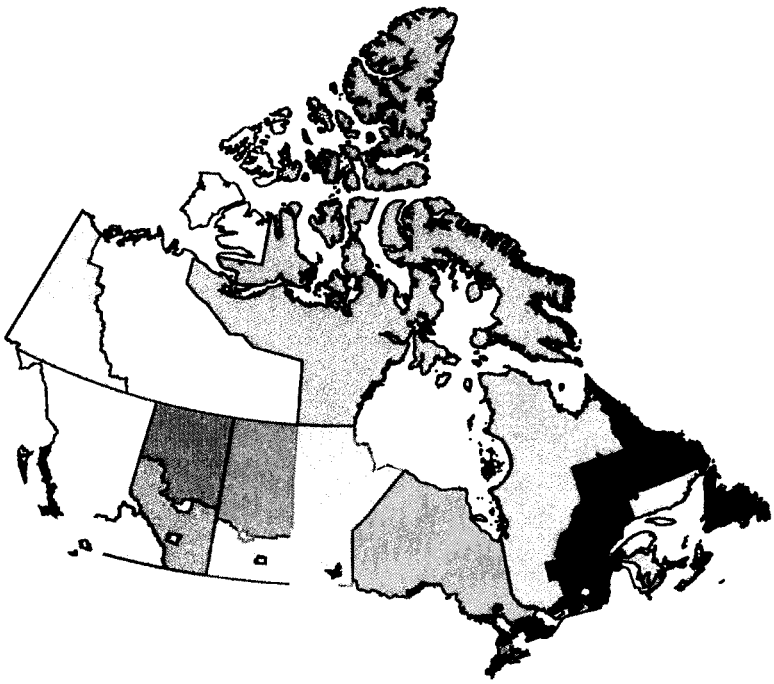

Figure 5: Canada and its 58 EI economic regions since 2000

Of course, the proposed changes to the EI regional boundaries meant that some claimants could face higher or lower entrance requirements and longer or shorter EI benefit entitlement, while maintaining overall cost neutrality in the EI program. Over the next few months, the experience with the new economic regions led to the implementation of transition measures for two EI economic regions in September of the same year. As mentioned, the regions affected were Madawaska-Charlotte in New-Brunswick and Lower St-Lawrence and North Shore in eastern Quebec. The transition averaged blended unemployment rates from the new regions and the adjacent regions to which they belonged before July 9, 2000 and used the higher of the average or the actual unemployment rate to determine entrance requirement and benefit entitlement. Initially the transition was set to last 3 years but has now been extended until April 2010.

III. EI BENEFIT ELIGIBILITY AND ENTRANCE REQUIREMENTS

A. Benefit Eligibility Requirements

The EI acts establish benefit eligibility rules stemming from the ability of an insured worker to show that he or she was essentially unemployed, capable and available for work but unable to obtain suitable employment. In addition to meeting this definition of an unemployed individual, to be eligible for EI benefits, the claimant has to show that he or she was in an *insurable employment* in which he or she contributed to the EI fund by paying premiums. The EI program has been funded solely on employee and employer premiums since 1994 when the federal government stopped contributing to the EI fund. The change in the funding of the program was done supposedly to make the program a pure insurance scheme.[8]

Since the introduction of EI, the program insures a proportion of a worker's earnings up to a maximum insurable earnings (MIE) level. Workers in insurable employment pay premiums on their earnings up to the MIE. In 1940, the MIE was $2,000 in a year, and workers paid premiums on their first $2,000 earned in the year. Over the next 55 years, the MIE was adjusted at frequent intervals to be proportional to the average annual employment wages.[9] The evolution of the MIE is presented in the first column of Table 1. In 1995, given the economic growth of the past years, the MIE was equal to $815 a week or approximately equal to $42,000 a year.

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[8] HRDC (1995a).

[9] HRDC (1995a).

The EI Reform in 1996 identified that average employment wages had grown much faster than average industrial wages in the past 15 years. In 1995, average industrial wages was about $30,000. This had the effect of raising the amount of premiums paid by some employees and employers. Facing premium inflation and increasing payroll costs, some small businesses threatened of job losses.[10] In 1996, the MIE was reduced and fixed to $39,000 a year until 2007 when average industrial wages exceeded the MIE. Since 2007, the MIE is set annually by the CEIC based on average industrial wages in the previous year. The MIE was equal to $42,300 in 2009 and increases to $43,200 in 2010.[11]

In the 1955 change to the *UI Act*, the benefit eligibility criteria were modified to a number of contributory weeks rather than contributory days. Therefore, to be eligible for benefits, a claimant required 30 weeks of contributions during the qualifying period (the 2-year period immediately preceding the claim), and at least 8 weeks of his or her insurable employment must have been made in the year immediately preceding the claim.

A strong critique of the new Act revolved around workers collecting proof they paid premiums for an entire week of contribution even if they worked only one day in that week. The issue remained until 1978, when a minimum was imposed on the definition of a work-week. Some exceptions to the program coverage were made, including extending coverage to certain workers in agriculture, in horticulture, in forestry and to municipal police members.

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[10] HRDC (1995b).

[11] HRDC (1995b).

Table 1: Evolution of benefit eligibility and entitlement provisions in the EI program, 1940-present

	Maximum insurable earnings per year or week	Qualifying period	Minimum insurable employment that entitles to benefit	Waiting period	Minimum weeks of benefit	Maximum weeks of benefit	Statutory benefit rate (without; and with dependants)
1940	$2,000	2 years	180 days (equiv. 26 weeks)	9 days	6	51	50%; 60% [+]
1955	$4,800	-	30 weeks	1 week (6 days)	15[o]	36	49%; 65%
1959	$5,460	-	-	-	-	56	-
1968	$7,800	-	-	-	-	-	51%; 66%
1971	$150/week	52 weeks	8 weeks	-	26-44	51	67%; 75%
1975	MIE indexed annually to average employment income, to	52 weeks[*]	-	-	-	-	-
1977[**]		-	10-14 weeks	2 weeks	14-42	38-50	67%; 67%
1979		-	-	-	-	-	60%; 60%
1990		-	10-20 weeks	-	17-39	35-50	
1993	$745/week	-	-	-	-	-	57%; 57%
1994	$815/week	-	12-20 weeks	-	14-32	36-50	55%; 60%
1996	$39,000	-	420-700 hours	-	14-26	36-45	-
1997	-	-	-	-	-	-	55%; 65% [++]
2000	-					32-45	55%; 80% [++]
2007	$40,000	-	-	-	-	-	-
2008-present	MIE indexed to average industrial wages	-	-	-	-	-	-

'-' To make reading the table easier, this character indicates that the information is the same as the previous row.

o There is a set *minimum basic benefit period* of 15 weeks by the regulations.

* Regulations allowed an extension of the qualifying period to 104 weeks for workers who were "out of the active labour force for reasons beyond their control", such as sickness, disability, or claimants on approved training and inmates in penal institutions.

** Introduction of the Variable Entrance Requirement (VER); the VER remained to this date, with slight modifications in the definitions of entrance requirement.

\+ In the *UI Act* 1940, benefit rate was not given as a percentage of income. The benefit rate is estimated to equal 34 times the employee contribution rate (ECR) for claimants without dependants and 40 times the ECR for claimants with dependants based on HRDC (1995), page 17. The ECR (weekly) was taken to equal 1.5 at the average (18¢ contribution / $11.8 earnings per week), based on table on page 14 in HRDC (1995).

++ From 1997 to 2000, the statutory benefit rate for claimants with dependants increased gradually from 65% to 80%.

Sources: Sargent (1995) and HRDC (1995a, 1995b).

With the 1971 *UI Act*, the minimum entrance requirement during the qualifying period was reduced to 8 weeks. The qualifying period was also changed to the shorter of the period of 52 weeks preceding the claim, and the period that begins on the commencement date of an immediately preceding benefit period, and ends with the end of the week preceding the start of the current claim. This later definition of the qualifying period remains to this date. Other changes to the UI program under the 1970 White Paper

which defined the 1971 *UI Act* included universal coverage for almost all types of employment. The exceptions included part-time employed earning less than $25 a week ceiling, self-employed workers, and provincial employees. The stamps book as proof of insurable employment was replaced by a "Separation Certificate" indicating information such as insurable earnings in the qualifying period and the reason for the separation. The separation certificate remains to this date and is now called the "Record of Employment". It must be attached to the claim.

Under the 1975 *UI Act* amendments, no changes were made to the eligibility provisions. Some changes to the UI coverage included the change from 70 years to 65, such that workers over the age of 65 no longer contributed to the program and were not eligible for benefits. The 65-year age-limit for UI benefits was later removed in 1991, retroactive to claims made by workers over 65 from September 23, 1988.

On December 4, 1977, the uniform entrance requirement of 8 weeks was changed to a "Variable Entrance Requirement" (VER) to reflect different local employment opportunities. The reasons for the change in the entrance requirement included that the 8-week entrance requirement had encouraged unstable work patterns and the notion that it was considered too low. Based on the unemployment in the UI economic region of residence, a claimant was required to have between 10 and 14 weeks of insurable employment during his or her qualifying period. In the legislation, the VER was to be in force for a period of 36 months after implementation, after which it could be extended by resolution of Parliament or the entrance requirement would revert to a uniform 14 weeks of insurable employment.

In 1978, minimum qualifying requirements were increased such that those working at least 15 hours per week or those who received at least 20% of their earnings

from insurable employment were covered by the program. Over the following years, the VER was gradually changed and included more regional unemployment-rate categories (see Table 2).

On February 11, 1990, the entrance requirement reverted to a uniform 14 weeks nation-wide, after the recurring legislation that permitted the VER did not pass the Senate. After Bill C-21 was passed in November 1990, the VER was re-introduced and entrance requirements ranged from 10 to 20 weeks of insurable employment. A study by the CEIC in 1991 found that the suspension of the VER from February to November 1990 led to a fivefold increase in the number of claims established with 14 week than during the same period in 1989. It concluded that the changes in the entrance requirement made claimants change their behaviour.[12] Other changes in Bill C-21 included modifications to the qualification requirement and to the benefit structure and the imposition of a total disqualification for workers who quit their job without "just cause" or lost their employment due to misconduct.

In 1994, the government modified the VER to a range of 12 to 20 weeks of insurable employment to entitle claimants to EI benefits, increasing the entrance requirement by 1 or 2 weeks in regions with unemployment rate higher than 14%. The change was intended to curb expenditures as the government slightly reduced the employee premium rate for the following two fiscal years. Reducing the premium rate helped the government deliver on an election promise to maintain or create 40,000 jobs.

[12] HRDC (1995a).

Table 2: Variable Entrance Requirement (VER), 1971-present

	Minimum weeks of insurable employment			Minimum hours of insurable employment
	Bill C-27 1978	Bill C-21 1990	Bill C-17 1994	Bill C-12 1997
Regional unemployment				
Under 6%	14	20	20	700
6% to 7%	13	19	19	665
7% to 8%	12	18	18	630
8% to 9%	11	17	17	595
9% to 10%	10	16	16	560
10% to 11%	...	15	15	525
11% to 12%	...	14	14	490
12% to 13%	...	13	13	455
13% to 14%	...	12	12	420
14% to 15%	...	11	...	...
15% and over	...	10	...	...

Sources: Lin, Zhengxi (1998), Statistics Canada Catalogue no. 75-001-XPE
HRSDC, EI Act, Schedule I

Since 1997, following the introduction of the *EI Act*, the entrance requirements to qualify for benefits were converted from *weeks* to *hours*, and ranged from 420 to 700 hours. In economic regions with unemployment rates below 6%, the minimum insurable employment is 700 hours, and in economic regions with unemployment rates above 13%, the minimum insurable employment is 420 hours. With each percentage increase in the regional unemployment rate, the entrance requirement decreases by 35 hours. After the conversion from a weeks-based to an hours-based entrance requirement, some part-time workers are required to work longer to claim benefits. Under the previous UI act, a week of work corresponded to a minimum of 15 hours worked such that a part-time worker who qualified with minimum work in the highest unemployment rate region required 180 hours worked (12 weeks times 15 hours). Such an individual is now required to work close to 2.5 more hours to qualify for benefit at 420 hours.

Special provisions for New Entrants, Re-Entrants and Repeat claimants

In 1978, a higher entrance requirement of 20 weeks was required from new-entrants and re-entrants in the labour force. It applied to those who enter the labour force for the first time (youths essentially – *new-entrants*), or return to the labour force after an absence (have less than 14 weeks of insurable employment in the 52 weeks preceding the current claim – *re-entrants*).

Workers with previous claims, or repeat users of UI benefits, also faced higher entrance requirements. Such claimants were defined as those with total number of weeks of benefit in their qualifying period exceeding the basic VER in their region of residence. Under the amendments to the Act, repeat claimants required an additional 6 weeks of employment if their regional unemployment rate was below 11%. Specifically, they required between 16 and 20 weeks of insurable employment depending on the regional unemployment rate below 11%. With Bill C-21 in 1990, repeat claimants no longer required to work up to 6 additional weeks to entitle them to benefits.

B. Calculating Entitlement and Benefits

In 1940, a qualified claimant had to serve a waiting period of 9 days before the beginning of the payment of their benefits. The waiting period was established partly based on administrative convenience and partly to mitigate cost of the program. It was also a key factor to explain that the newly introduced unemployment benefit program was an "insurance program"; the waiting period was comparable to the deductible portion of an insurance plan and served to disqualify very short periods of unemployment.[13] The evolution of the waiting period is presented in the fourth column of Table 1.

[13] HRDC (1995a).

Under the original 1940 Act, the maximum duration of benefit was 1 day of benefit for each 5 days of contributions made in the previous 5 years, less 1 day for each 3 days of benefits received in the previous 3 years, to a maximum of 51 weeks. This was defined as the "ratio rule", permitting a claimant with 5 years of continuous employment to get one year of benefits, while limiting benefit duration for seasonal workers. The ratio rule could be re-written, with the letter '*B*' standing for benefit days and '*C*' for contribution days, as follows:

$$\textit{Maximum benefit duration} = (1\ \text{B} / 5\ \text{C}) \times \textit{No. of}\ \text{C}\ \textit{in past 5 yrs} - (1\ \text{B} / 3\ \text{B}) \times (\textit{No. of}\ \text{B}\ \textit{in past 3 yrs}).$$

A claimant with just the required minimum insurable employment and no previous UI benefit claim in the past 3 years could receive benefits for 36 days, or about 6 weeks. On the other end, given the ratio rule, workers with longer labour force attachment could get the maximum benefit period of 51 weeks (or one year less the 1-week waiting period) depending on the length of time of previous insured employment and contributions. For example, workers who averaged 30 weeks of insurable employment per year could receive benefits for all weeks of unemployment in the remainder of the year for 2 successive years; after this, the ratio rule shortened the benefit duration to about 17 weeks in the 3rd year, and to about 11 weeks in the 4th year before it permitted the benefit duration to increase to about 14 weeks in the 5th year. The minimum and maximum number of benefit weeks that were payable are presented in the fifth and sixth column of Table 1, respectively.

The 1955 Act introduced a "basic minimum" benefit period of 15 weeks. The basic minimum benefit period was instituted to provide a longer basic minimum period of benefit because it was found that under the older act, the minimum duration of six weeks'

benefits after the minimum 180 qualifying contribution-days was insufficient to carry many claimants over their actual period of unemployment. This applied especially to immigrants, to young persons and others who had newly entered insurable employment and to persons unable to obtain steady employment and thus build up a solid record of contributions. In addition, claimants could get one additional week of benefit for each additional two weeks of contributions, for a total maximum benefit period of 36 weeks (equivalent to 72 weeks of contributions). This new maximum benefit period was reduced from 51 weeks (52 weeks less the one-week waiting period) given the high proportion of claimants who did not use the long period of entitlement that was often set up for them.

A key defining feature of the Canadian EI program in the last few decades has been the regional differentiation provision. The waiting period was also increased to 2 weeks with the passage of Bill C-229. Since 1971, and particularly since 1977-1978 when the number of UI economic regions increased from 16 to 48, benefit entitlement is linked to the unemployment rate in the economic region where the claimant resides. As a result, workers in regions of high unemployment are entitled to longer benefit periods. In 1971, the legislation created a 5-phase benefit structure under which claimants received benefits on the basis of labour force attachment in the first 3 phases of the structure, and on the basis of unemployment rates in the latter 2 phases of the structure. The 5 phases of the benefit structure were contiguous in that claimants received an "initial benefit period" in Phase 1 of the structure, followed by 2 extended benefit periods for longer and longer labour force attachment in Phases 2, and 3. Then, in Phase 4 and 5 respectively, claimants were entitled to additionally extended benefit periods, if the national unemployment rate was over 4% and up to 5% (Phase 4) and if the regional unemployment rate exceeded the

national unemployment rate by at least 1 percentage point. Overall, the 1971 benefit structure allowed for a 51-week total maximum of payable weeks of benefit.

Unemployed workers received at least 8 weeks of EI benefits after 8 to 15 weeks of insurable employment, and up to 15 weeks of benefit for additional weeks of work up to 20 weeks (Phase 1). When a claimant was still unemployed after their initial benefit period, s/he received automatically 10 additional weeks of benefits for a total of 18 to 30 weeks of benefits (Phase 2). Stronger labour force attachment (20 weeks and more in a year) entitled claimants to a total of at least 27 weeks of benefit. An additional week of benefit for every 2 additional weeks worked were also paid, up to a maximum total of 43 weeks of benefits given to an individual who had worked a full year (of 51-52 weeks). This maximum was the combined effect of Phases 1 to 3. In Phase 4, 4 or 8 additional weeks of benefits were paid if the national unemployment rate exceeded 4% or 5%. The basis of this calculation was a 3-month moving average of national unemployment rates, adjusted seasonally and provided by Statistics Canada. Given this criteria, entitlement was changed monthly to reflect changes in the moving average. In the last phase of the benefit structure, claimants received 6, 12 or 18 weeks of benefit when their regional unemployment rate exceeded the national rate by 1, 2 or 3 percentage points respectively. For each of the 16 EI regions, Statistics Canada provided a 12-month unadjusted moving average rate of unemployment.

This benefit structure was later replaced by a 3-phase benefit structure in 1977-78, because the 5-phase structure, besides being relatively difficult to comprehend, included limited flexibility in the initial benefit phase and created some re-employment disincentives in the "extended phases". The 1977 three-phase benefit structure allowed for a total maximum duration of benefits of 50 weeks, or 52 weeks from the start of the

claim (given a 2-week waiting period). The new benefit structure mainly combined the first two extended benefit periods into one extended benefit period and the extended benefits related to unemployment rates in one benefit period. It read as follows:

- Phase 1: The "initial benefit phase" provided 1 week of benefits for each week of insured employment, to a maximum of 25 benefit weeks;
- Phase 2: The "labour force extended phase" provided for an additional week of benefits for each two weeks of insured employment in excess of 26 weeks, to a maximum of 13 weeks of benefits; and,
- Phase 3: The "regional extended benefit phase" provided for two weeks of benefits for each 0.5 percentage point increment in the regional unemployment rate in excess of 4.0 %, to a maximum of 32 weeks of benefits.

Since 1996, for the purpose of meeting benefit qualifying criteria, the regional unemployment rate that is applied to a claim is the average of the seasonally adjusted monthly unemployment rates for the last three-month period that precedes the last week of employment for which statistics were produced by Statistics Canada.

Workers receiving EI benefits while unemployed received weekly benefit payments that represented a portion of their insured earnings before claim. Benefits received in a week could not exceed a maximum EI weekly benefit (MWB) set annually to equal a proportion of the maximum insurable earnings in a week. Workers who earned more than the MIE in the year prior to their benefit claim received the MWB for every week of benefit entitlement. Since 1997, the MWB is equal to 55% times the MIE divided by 52.

The EI program generally applied a higher replacement rate of income for claimants with dependants compared to claimants with no dependants. This program criterion is strengthened since 2000. The last column of Table 1 presents the statutory

replacement rate that applied to claimants without dependants and that for claimants with dependants after a semicolon. For claimants with dependants and in low-income families, the EI program pays a "Family Supplement" (FS) benefit atop their EI benefits. The FS benefit is paid to a worker if s/he or their spouse received Child Tax Benefit payments in the year. The EI program identifies a "low-income family" claimant by linking his or her claim to their family income tax files. The lower-income limit entitling for the FS benefit and receiving weekly EI benefit replacing a higher proportion of a worker's earnings is set and adjusted annually by Department of Revenue Canada. Such claimants could receive EI weekly benefits replacing up to 80% of their weekly earnings, up to the MWB. Since 1997, the statutory benefit rate applied to all other workers is 55% of weekly earnings, up to the MWB. Those who earned less than the MIE received 55% or up to 80% of their earnings if they received the FS benefit.

C. Calculating the Regional Unemployment Rate

The regional and national unemployment rates for the EI program are determined monthly by Statistics Canada using estimates from the results of the Labour Force Survey (LFS). The LFS was initiated in November 1945 and conducted quarterly until 1952. Since November 1952, the LFS is conducted monthly and its results are released in the first week of the month. The EI benefit structure is thus updated on a continuous basis. For the period between 1971 and 1976, a 3-month moving average of national unemployment rate, seasonally adjusted, was used to determine benefit entitlement under the "national extended phase". For the "regional extended phase", benefit provisions used a 12-month, unadjusted moving average to determine benefit entitlement.

When the 1977 Act changed to a 3-phase benefit structure, the unemployment rate used to determine entitlement was defined as the 3-month, seasonally adjusted, moving average of regional rates of unemployment. This was effectively done to increase work incentives and partially to relate the entitlement to extended benefits more directly to regional unemployment rates as an indicator of the difficulty of finding and keeping jobs in the claimant's region of residence.

The EI program administers benefits based on the claimant's place of residence based on a number of primary considerations. First, the place of residence was already used for the administration of certain government programs such as the income tax system and social assistance. Workers pay taxes based on their place (province) of residence as of December 31 of the reporting year. The social assistance programs that existed before the introduction of the UI program in 1940 and their later substitutes were locally-administered based on the province of residence. Another consideration included that workers can be simultaneously employed by more than one employer. It would have been difficult to establish entrance requirements based on the location of the employer, particularly if the employers were located in different EI regions. Finally, the policy is consistent with administrative law and jurisprudence as where provincial programs similar to a federal program are established, the province provides the program.[14] It is the case for the *Quebec Parental Insurance Plan*, which provides a package of special benefits to Quebec residents. The QPIP program is more generous and inclusive than the EI program.[15] As a result, the regional unemployment rates calculated by Statistics

[14] HRDC (1995a).

[15] A clear distinction between the *Quebec Parental Insurance Plan (QPIP)* and EI resides in that *QPIP* provides parental benefits to self-employed individuals. The federal government has recently introduced

Canada that are used to define entrance requirement and benefits payable are those of the place of residence of the worker.

It's important to note that there exist challenges to accurately estimating the unemployment rate. The LFS was designated by the EI acts as the source of the monthly regional unemployment rates for the administration of the EI program. Labour mobility over time affects the distribution of the total population and the composition of the regional labour markets. As a result, Statistics Canada updates the LFS sample design every 10 years based on the decennial population census to reflect the new distribution of the national population and the new delineation of the geographical boundaries. The last LFS sample re-design occurred in 2005 and current LFS releases starting in January 2005 are based on the distribution of the population from the 2001 census. In 2005, previous LFS releases going back to 1976 were adjusted to reflect the new LFS sample design. With each LFS sample re-design, the target population for the LFS is adjusted to mirror the new relative distribution of the population across provinces, rural and urban areas, as well as gender, and age characteristics. The weights applied to each individual in the LFS sample are also adjusted accordingly to retain proper benchmarks for producing efficient survey estimates.[16]

The current economic regions for the purposes of administering EI, however, are still based on the geographical boundaries and population distribution from the 1996 census. As previously discussed, these EI boundaries were established in 2000. All information reported and used for EI, such as the unemployment rate and the population

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Bill C-56 *"Fairness for the Self-Employed"* on November 6, 2009 to amend the EI act and provide special benefits to the self-employed. At the time of writing, Bill C-56 has not been passed.

[16] Statistics Canada (2005).

counts, is thus slightly different from current population characteristics. Moreover, given that statistical estimates for small geographic areas are subject to a high variance, labour force statistics, including the unemployment rate, for EI regions are reported as 3-month moving averages and generally seasonally-adjusted. Statistics Canada provides the Survey's statistics as three-month moving averages to reduce the "irregular movements caused by relatively small sample sizes".[17] Controlling for sampling variability is important for census metropolitan areas given their relatively small size and for regions with a more sparse population because of they are prone to higher relative standard errors or coefficients of variation (the standard error of an estimate divided by the estimate). Seasonal adjustment of the LFS estimates is also necessary to improve analysis of short-term changes in the labour force characteristics. This removes annually-recurring variations in the data that could be due to weather and regular events such as holidays and vacations.

The LFS sample design incorporates certain data quality criteria based on acceptable sampling error limits. The sample is adjusted to meet these targets. For the 3-month moving average estimates for EI regions, the coefficient of variation should be no more than 15%.[18] This ratio is set at 2% for Canada as a whole and at between 4% and 7% for the provinces. Statistics Canada thus updates the regional unemployment rate every month, using the most recent three-month data from the Labour Force Survey to produce relatively efficient estimates.

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[17] The *Data sources and methodology* section of the guide to the Labour Force Survey provides detailed information on various issues and methodology used in calculating estimates from the LFS, including the sampling variance.

[18] Statistics Canada (2009b).

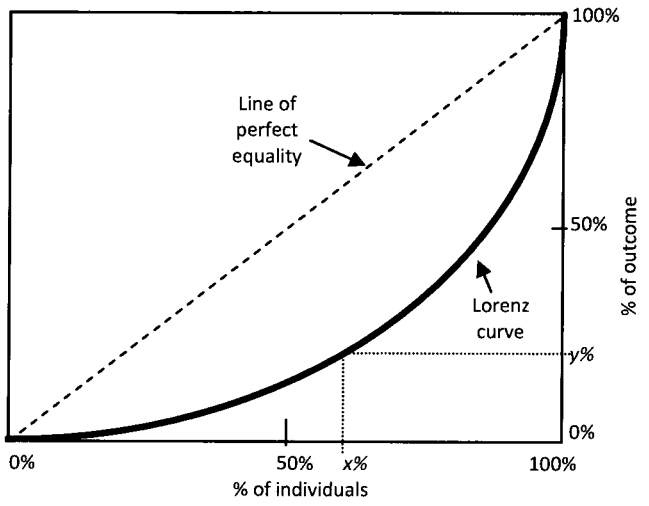
As it was discussed in this section, the program design includes different rules for different parts of the country. Over the years, the number of EI regions has increased from 1 before 1971 to 58 since 2000, resulting in program rules that are more and more tailored to the structural dynamics of given regions in Canada. Workers who live in regions of high unemployment essentially have higher access to the program benefits for their first and subsequent benefit claims since they face lower entrance requirements. At the same time, it is assumed that the difficulty in finding a job is increased in regions of high unemployment. Indirectly, it is assumed that it would be more difficult for those claimants to re-qualify for benefits, hence the lower entrance requirement. As a result of the varying entrance and benefit structures, it can be expected that the amount of benefits paid might not be equally distributed across regions and provinces. This essentially reflects the program's objective to recognize the differences in job opportunities across the country. If these differences are pronounced, then we can expect that there will be inequality in the distribution of benefits, which could either be increasing or decreasing as the number of EI regions is increased.

IV. MODELLING AN INDICATOR OF INEQUALITY IN EI BENEFITS

A. The Gini coefficient

The Gini coefficient is an often-used measure of inequality. Though it is mostly known for its use in measuring inequality of income or wealth, it is actually a *general measure* of statistical dispersion. Other common measures of statistical dispersion include the standard deviation, the coefficient of variation or the relative standard error, the range, the Theil Index, generalized entropy measures GE(α), and many more.

The Gini coefficient is represented graphically by the Lorenz curve. The Lorenz curve represents the cumulative distribution of a probability density function of a given statistic Y. For a set of data points, the points are ranked from lowest to highest values along a continuum of the measured statistic to build a Lorenz curve. The curve depicts the proportion $y\%$ of the total distribution that is assumed by the bottom $x\%$ of the values. For example, in the common case of measuring income dispersion for a country, individuals are ranked by increasing income earned. The points on the Lorenz curve indicate that the bottom $x\%$ of the earners altogether have $y\%$ of total income (see graph below).



From the graph above, the Gini coefficient is calculated as the ratio of the area between the Lorenz curve and the "line of perfect equality" (LPE) over the total area under the LPE. It is thus equal to twice the area between the Lorenz curve and the (LPE), since the total area under the LPE is equal to one half. Alternatively, in a population with n individuals, if Y_i and Y_j represent the outcomes (for example incomes) received by the individuals i and j, respectively, and Y^* the average outcome (income) in the population, the Gini coefficient can be mathematically expressed as follows:

$$Gini = \frac{1}{2n(n-1)Y^*} \sum_{i=1}^{n} \sum_{j=1}^{n} |Y_i - Y_j|$$

The value of the Gini coefficient ranges from 0 to 1, assuming the statistic Y is well behaved (i.e. Y takes generally positive values and has a positive mean).[19] The Gini is equal to zero when every individual has the same outcome – that is when $Y_i = Y^*$ for every individual i. A Gini equal to zero indicates no dispersion in the statistic Y and thus no inequality. In this case, the Lorenz curve is identical to the LPE, and the statistic or

[19] The Gini may take a negative value if the mean outcome of the statistic Y^* is negative. It can also take a value greater than 1 if there are some very large negative outcomes (Scott and Litchfield, 1994) as discussed in Litchfield (1999).

outcome is equally distributed across the population. Higher values of the Gini indicate increasing dispersion or variability in the data. A value of close to 1 indicates that the measured statistic is most unequally distributed. We have the greatest dispersion possible in the data, or complete inequality in the distribution. If this is the case, one individual or a very small proportion of the population accounts for the entire proportion of total outcomes. In this case, the Lorenz curve coincides with the horizontal axis.

Some advantages of the Gini coefficient include that it is relatively easy to calculate, to interpret, to visualize and to compare. Another important characteristic is that since the Gini can be seen as a ratio, it is independent of the scale of the measured statistic and of the size of the population.

On the other hand, the Gini coefficient has a few limitations. Any measure of inequality is highly sensitive to the individual unit considered, that is, to the stratification of the total population. Measures of inequality generally found in the literature always consider the *individual* – the individual earner or the household for example to analyse inequality in the distribution of income. The finer the stratification, the more accurate is the measured level of inequality in the outcome.

Accordingly, one cannot take the average of the Gini coefficients of different sets of people to obtain the Gini coefficient of all the people in the sets. In other words, if we were to compute the Gini coefficient for different regions in Canada and we averaged them, this latter measure will be smaller than the Gini coefficient calculated for Canada as a whole. The difference stems from the fact that certain economic activities are concentrated in certain regions and regional income can be more or less constant, or more or less equally (re)distributed among the individuals in the region. This economic

diversity of the country as a whole usually results in a higher Gini than the average of its regional Gini coefficients. As a result, the value of the Gini tends to increase across larger areas. This discussion is equivalent to saying the Gini coefficient is not additive and cannot be easily decomposed into between-group and within-groups variations.[20] Yitzhaki and Lerman (1991) have found a solution to the non-decomposability of the Gini. The authors demonstrated how stratification of subgroups contributes to overall inequality and presented a decomposition of the Gini into between-group inequality, within-group inequality and a term for the degree of subgroup stratification.

Another limitation of using Lorenz curves or the Gini coefficient in the analysis of inequality comes from the fact that Lorenz curves of different shapes can still yield the same value of Gini. This characteristic of the Gini coefficient suggests that one cannot unambiguously identify if the measured statistic is more (un)equally distributed in the tails of the distribution or in its center. Lorenz curves may also intersect and offer ambiguous signals when summarized as a Gini coefficient. For these reasons, one should be cautious when comparing the Gini coefficient over time, or across different variables.

Another common used measure for inequality is the Theil's index T. Given the same notation as before, the Theil index T can be expressed as follows:

$$Theil\_T = \frac{1}{n}\sum_{i=1}^{n}\frac{Y_i}{Y^*}\ln\left(\frac{Y_i}{Y^*}\right)$$

The value of the Theil index T ranges from zero which indicates the lowest inequality, to $ln(n)$ which indicates the highest inequality. The Theil index T can be converted by $1\text{-}e^{-T}$ into an inequality coefficient which ranges from 0 (no inequality) to at

[20] Litchfield (1999).

the limit 1 for large sizes of population n. It is important to note that the Theil index T corresponds to one of the generalized entropy measures of inequality GE(α) after applying l'Hôpital rule with α equal to 1. In the class of generalized entropy measures, the parameter α is a real number that indicates the weight given to the distance between outcomes at different parts of the distribution of the statistic (or outcome) of interest. In the case of α equal to one, the *GE* measure applies equal weights across the distribution of the statistic of interest. In comparison, with lower values of α, the *GE* measure will be more sensitive to changes in the lower tail of the distribution, and with higher values of α, the *GE* measure will be more sensitive to changes in the upper tail of the distribution. The class of *GE* measures regroups indicators which formula can be generalized into

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{Y_i}{Y^*}\right)^{\alpha} - 1\right].$$

Measures in the *GE*(α) class take values ranging from zero to infinity, with zero indicating that the outcome is equally distributed, and higher values indicating higher levels of inequality. The GE class of measures is at times preferred to the Gini, as the *GE* can be easily decomposed into a component for between-group inequality and a component for within-group inequality.[21] This class of measures, however, does not have an easy visual representation as the Gini.

The use of one measure of inequality or another depends thus solely on the purpose. Nonetheless, the desirable and essential properties for measures of inequality include that they are bounded between 0 and 1, anonymous (not attached a unit of measurement), and satisfy the Pigou-Dalton transfer principle. The Pigou-Dalton transfer

[21] Litchfield (1999).

principle states redistributing total outcomes so as to increase the relative outcome of the individuals in the center of the distribution should make inequality lower. This principle is fundamental to the income-redistribution policies, and programs such as the EI program. Good measures of inequality must also be invariant to the scale of the measured statistic and to replications of the population; in other words, they must satisfy the scale independence and the principle of population.

B. A Measure of EI Benefit Inequality

Given the objective of the present paper, the "ideal" individual unit of comparison would be the *worker* or *claimant*, as is the case in the income inequality literature.[22] Alternatively, one could estimate benefit inequality using the *EI economic regions* to get a good estimation of EI benefit inequality. At the time of writing, public microdata on EI program statistics was inexistent and data at the EI region level was not available from existing data sources.

The paper thus constructs a Gini coefficient to measure benefit inequality using the provinces as the units of analysis, since there was no available individual or household, nor EI region level information. An analysis at the provincial level reflects at the minimum the public policy concerns cited in the beginning of the essay: equal access for equal contribution to the EI program at the provincial level and national level. For each province in Canada, we calculate the ratio of the total number of weeks of benefit paid divided by the number of people in the labour force. This corresponds to the average number of weeks of EI regular benefit paid for a member of the labour force. We then rank the geographical units in increasing order of their calculated *average weeks of*

[22] It would be essentially equivalent to use the individual household as the individual unit of comparison.

benefit to the labour force. This ranking procedure differs slightly from that used to graph the Lorenz curve in the income inequality methodology, where ranking would have followed the increasing order of the provincial shares of the labour force. Ranking by average weeks paid was preferred because it incorporates a normalization of the dispersion in the number of weeks paid given the size of the labour force of each province.

Next, following this ordering, we calculate cumulative shares of the labour force and of the number weeks of benefit paid. In a XY plane, we retain the vertical axis for the cumulative distribution of the number of weeks of benefit paid, and the horizontal axis for cumulative share of the labour force.

V. MEASURED INEQUALITY IN THE REGIONAL DISTRIBUTION OF EI BENEFITS

Our data covers the period from 1966 to 2008. Annual labour force estimates exist readily in Statistics Canada's *CANSIM* database over the period 1976-2008. Labour force estimates before 1976 were obtained from Statistics Canada. We note that the major redesign of the LFS questionnaire in 1976 has consequences for the comparability of labour force numbers before and after 1976. Comparability issues are minimized for years going back to 1966 as Statistics Canada adjusted the historical series going back to that year based on the relationship between the old and the new questionnaire of 1976.[23]

Data on the number of weeks of EI benefit paid was available on a monthly basis over the same time period (total benefit weeks paid over 1966-1996 and regular benefit weeks paid over 1997-2008) in Statistics Canada's *CANSIM* database. We selected labour force estimates and EI benefits weeks paid at the provincial level, and excluded the territories to have a data series that is reliable over time.

We consider the data for 2008 as an example to illustrate the Lorenz curve and the Gini coefficient. The number of EI benefit weeks paid is summarized over the months into an annual level. Table 3 shows that there exist differences across the provinces.

[23] Statistics Canada (2006).

Table 3: EI regular benefit weeks paid and labour force by province, 2008

	EI regular benefit weeks paid	Percent of total EI Regular Benefit Weeks Paid	Labour force (LF)	Percent of Labour Force
Alberta	1,129,930	4%	2,088,100	11%
British Columbia	2,381,180	9%	2,425,900	13%
Saskatchewan	491,370	2%	534,700	3%
Manitoba	638,690	2%	633,000	3%
Ontario	7,693,010	29%	7,154,500	39%
Quebec	8,816,000	33%	4,184,900	23%
Nova Scotia	1,504,310	6%	491,000	3%
New Brunswick	1,705,960	6%	400,600	2%
Prince Edward Island	441,610	2%	78,700	0%
Newfoundland	1,991,690	7%	253,800	1%
Total	**26,793,750**	**100%**	**18,245,200**	**100%**

As detailed in the previous section, we calculate average benefit weeks paid to an individual in the labour force for each province. Then the cumulative shares of the labour force and of the number of EI benefit weeks paid based on the increasing order of average benefit weeks are calculated. The results are presented in Table 4. By graphing the points representing the cumulative shares of the labour force and of the number of EI benefit weeks paid, one obtains the Lorenz curve for year 2008 in Figure 6.

Given the unit of analysis is the province, the points on the curve indicate the share of total benefit weeks that was received by the "*lowest-compensated*" share of the total force using provinces as units of increment. We define "lower-compensated" provinces as those with a lower average number of EI benefit weeks paid to their labour force. For example, the point labelled "+*MB*" indicates that in 2008, all the provinces with average EI regular benefit weeks paid lower than or equal to that of Manitoba, which together amount for 31% of the national labour force received 17% of total weeks of

benefit paid. An estimate of the Gini coefficient gives the value of around 30% for benefit inequality.[24]

Table 4: Distribution of EI regular benefit weeks paid and labour force, 2008

		Benefit weeks paid	Labour force	Average weeks of benefit paid to an individual in the labour force	Percentage of the total benefit weeks paid	Percentage of labour force	Cumulative percentage of labour force	Cumulative percentage of total benefit weeks paid
Alberta	(1)	1,129,930	2,088,100	0.54	4%	11%	11%	4%
Saskatchewan	(2)	491,370	534,700	0.92	2%	3%	14%	6%
British Columbia	(3)	2,381,180	2,425,900	0.98	9%	13%	28%	15%
Manitoba	(4)	638,690	633,000	1.01	2%	3%	31%	17%
Ontario	(5)	7,693,010	7,154,500	1.08	29%	39%	70%	46%
Quebec	(6)	8,816,000	4,184,900	2.11	33%	23%	93%	79%
Nova Scotia	(7)	1,504,310	491,000	3.06	6%	3%	96%	85%
New Brunswick	(8)	1,705,960	400,600	4.26	6%	2%	98%	91%
Prince Edward Island	(9)	441,610	78,700	5.61	2%	0%	99%	93%
Newfoundland	(10)	1,991,690	253,800	7.85	7%	1%	100%	100%
Total		**26,793,750**	**18,245,200**		**100%**	**100%**		

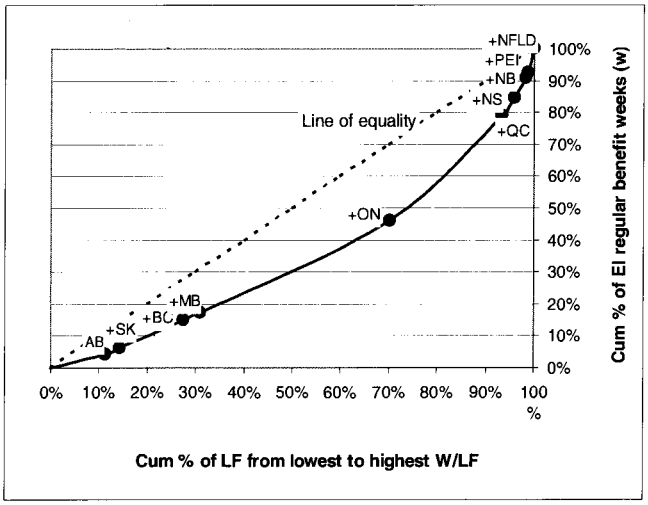


Figure 6: Distribution of EI regular benefit weeks paid by distribution of the average number of EI regular benefit weeks paid to labour force, 2008

[24] The calculated Gini coefficient was obtained using the *"Ineqdeco"* ado-file in Stata. *Ineqdeco* was written by Stephen P. Jenkins in 2008 and estimates a range of inequality and related indices that are commonly used by economists.

We recall that from 1966 to 1996, benefit weeks represent *total* EI benefit weeks paid, with half-year reporting for 1996 (January to June). From 1997 to 2008, benefit weeks represent EI *regular* benefit weeks paid. We computed the Gini coefficients and Theil index using a program written by Jenkins (2008) for use in Stata. We use the provincial labour force shares as weights. The Theil coefficient is obtained from the Theil index *T*, given by Stata, as equal to *1-exp(-T)*. Figure 7 depicts the evolution of the two coefficients over 1966-2008. The Gini is read off of the left axis, and the Theil coefficient is read off of the right axis. Appendix B gives the computed values of the Gini and Theil. The breaks in the inequality series represent the change in the data from of any type of benefit weeks paid to of regular benefit weeks paid.

In general, the calculated Gini coefficient ranged between 0.26 and 0.34 over the period 1966-2008. The calculated Theil coefficient ranged between 0.13 and 0.21 over that period. The level of the estimates suggest that inequality in the payment of benefit weeks could be slightly higher among regular benefit weeks paid than total benefit weeks paid, regardless of the inequality measure used.[25] One would need further tests to ascertain the importance of the dissimilarity before and after 1997.

[25] Total EI benefits include both EI regular and EI special benefits. The entrance requirement for EI special benefits is uniform at 600 hours worked in the year (since 1997) and the entitlement for special benefits is the same for all claimants. As a consequence, if one were to assume that the distribution of special benefits is constant across regions, it is not expected that having special claims in the data would largely affect the measured benefit inequality. We make such an assumption. In fact, this assumption does not hold completely as the data shows – some EI economic regions have a higher proportion of special claims and benefit weeks paid relative to others (Source: *MARs*).

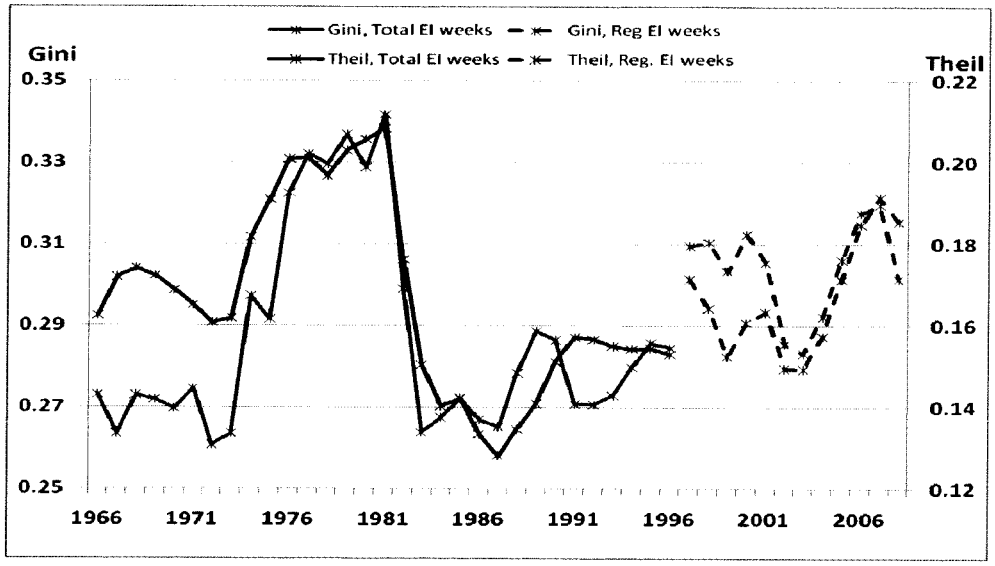


Figure 7: Inequality in EI benefit weeks paid to the labour force, 1966-2008

It's important to note that the measures of inequality like the Gini and the Theil coefficients give little information about where inequality in the distribution of the average number of EI benefit weeks paid to a member of the labour force is greatest. There is no indication of if inequality in benefit weeks paid is higher in the tails of the distribution or in its center. As we already noted, a given Gini coefficient could be obtained with different shapes of the Lorenz curve of distribution.

Overall, pictures of Lorenz curves for different points in time over the period 1966-2008 (Figures 8 (*a*) through (*c*)) suggest significant changes in the level of inequality in benefit weeks paid to the labour force. The reader can find the detailed labour force numbers and the number of benefit weeks paid graphed here in Appendix C. Benefit inequality as measured by twice the size of the area comprised between the LPE and the Lorenz curves decreased then increased between 1966 and 1977 (Figure 8 (*a*)). There exists a turnaround point around 1971, suggesting the evolution of the economy's structure and the effects of the UI program between 1966 and 1971 contributed to a temporary decline in benefit inequality. This is consistent with previous papers that

documented an increase in the generosity of the 1971 *UI Act*. In Sargent (1995), the author presented a measure of EI generosity measured as the ratio of the maximum number of weeks of benefits payable to an individual qualifying with the minimum insured employment to the level of minimum insured employment. That generosity measure increased more than fivefold from as low as 0.5 before 1971 to 5.5 in 1971. The reader can find a graph of the evolution of Sargent's generosity measure in Figure D1 of Appendix D. Both the benefit inequality (referring to the relative areas over in the figure) and Sargent's generosity measure suggest EI program changes in 1971 improved the relative distribution of benefit weeks paid to an individual in the labour force.

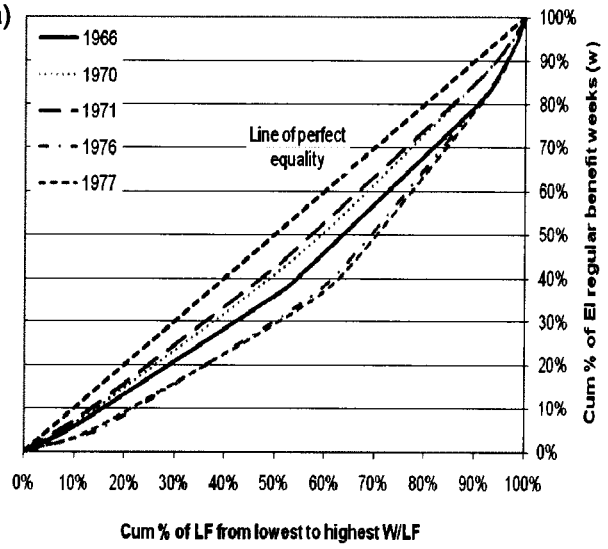
The reversal in the level of benefit inequality between 1971 and 1977 can be explained in part by changes implement in the 1977 *UI Act*. The 1997 *UI Act* had the objective of decreasing access to benefit using the VER, such that in some regions workers needed more insured weeks to claim benefit. Sargent's generosity measure captured this decrease in the EI program generosity: it decreased to 4.2 in 1977. Interestingly, the Gini coefficient computed earlier did not show large movements relative to the changes seen in the shape of the Lorenz curves. It is important to note from this discussion that the Gini measures *inequality in the payment of benefit weeks to the provinces* while Sargent's generosity measure measures the *generosity at the national level*. Together, they present different formalizations of the effects of the tightening of the EI program provisions.

The UI program did not undergo any major change to the program's eligibility or benefit provisions until 1990. The program changes implemented in the 1980s and 1990s were to further tighten benefit eligibility rules. Benefit inequality was roughly the same in 1989 as it was in 1977. Program changes in the 1990s (1990 and 1994) seem to have

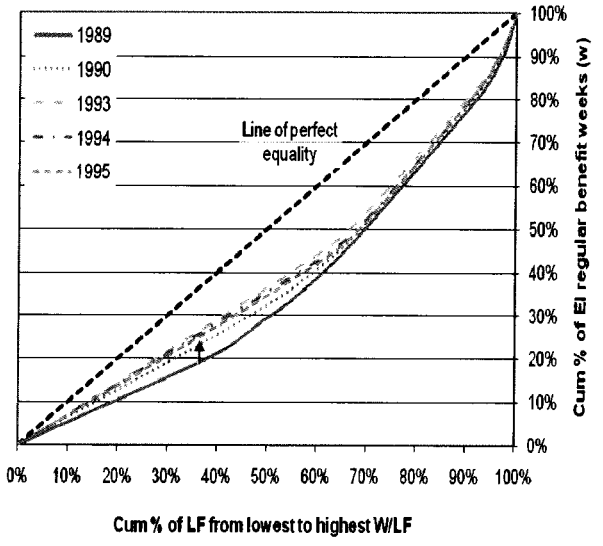
induced a slight decrease in benefit inequality, though it remained approximately at its 1977 level (Figure 8(*b*)). The graphs also suggest the *lowest-compensated* provinces experienced a more equal distribution of benefit weeks paid to an individual in their respective labour force. This is indicated by the upward arrow in the lower part of the figure 8(*b*). Sargent's generosity measure declined gradually in the late 1970s and in the 1980s. The measure dropped to approximately 2.7 in 1994. The estimated Gini over the period is also consistent with the relative movements of the Lorenz curves.

In Figure 8(*c*)), the Lorenz curves represent the distribution of EI regular benefit weeks paid to the labour force for selected years between 1996 and 2008. The movement of the graphs suggests benefit inequality increased slightly after 1997 and remained almost unchanged since. The estimated Gini in Stata over the period is consistent with the relative movements of the Lorenz curves. Interestingly, Sargent's generosity measure remained constant at around 1.2 since 1997 suggesting that at the national level, EI generosity has not changed. In contrast, the Gini coefficient and the Lorenz curves suggest benefit inequality within provinces varied between 1997 and 2008.

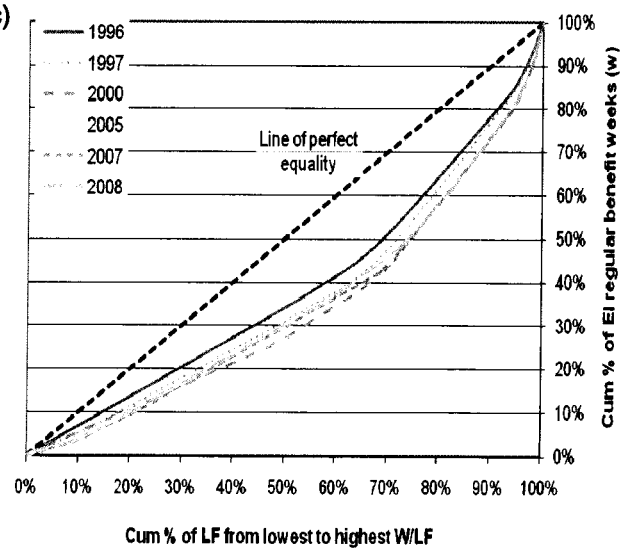
(a)


1966
1970
1971
1976
1977
Line of perfect equality
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cum % of EI regular benefit weeks (w)
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Cum % of LF from lowest to highest W/LF

(b)


1989
1990
1993
1994
1995
Line of perfect equality
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cum % of EI regular benefit weeks (w)
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Cum % of LF from lowest to highest W/LF

(c)


1996
1997
2000
2005
2007
2008
Line of perfect equality
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cum % of EI regular benefit weeks (w)
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Cum % of LF from lowest to highest W/LF

Figures 8: Selected Lorenz curves of EI benefit weeks paid to the labour force, 1966-2008

The analysis of the Lorenz curves and of the measured Gini and Theil coefficients suggests that some provinces received relatively less EI benefit weeks paid than their relative share of the total labour force. We reiterate that the current research considered individual provinces as representing the strata of total labour force since, at the time of writing, microdata and EI region data was not available from existing sources.

In relation with our discussion in the previous section on the sensitivity of the Gini coefficient to the stratification in the population, the current paper raises an important gap in the reporting of employment programs statistics. We note also that detailed EI statistics at the EI region level are presented in the annual EI Monitoring and Assessment Reports (MAR). The first MAR was released in 1998 to evaluate the effect of the *EI Act*. The 2007 and 2008 MARs provided statistics by EI region on the total number of claimants and the total number of benefit weeks paid in the year.[26] The MARs reported either the total number of claimants (regular and special benefits altogether) or the number of regular benefit claimants in a year and the total number of weeks of benefit paid (regular and special benefits altogether) or the number of weeks of regular benefit paid in the year, but not consistently for a given year of interest. Since it was not possible to have a complete data series over two years, we were not able to make use of this source to test how benefit inequality at the individual regions compared to our measure presented here. This paper is interested only in EI *regular* benefits, and given the lack of continuity in the data reported in the two reports, the available data was not useful. We anticipate

[26] The reader can refer to the appendices for "Community Profiles" of the *MARs* published in 2007 and 2008 for these statistics.

however that future research could have access to even more detailed and efficient data on employment insurance statistics. When we analyze the MAR on a year to year basis, the most recent report (2008) provided "better" program statistics, as it reported the number of EI regular benefit weeks paid for *completed* claims of the previous year, not the current year of reporting. This particularity is very important. A claimant could start collecting his/her EI benefits towards the end of the reporting year and finish collecting benefits in the following reporting year. It would be advisable that more detailed data be available to allow relevant public policy discussion and research.

VI. EMPIRICAL ANALYSIS - DECOMPOSITION OF THE EI BENEFIT INEQUALITY

In this section, we estimate regressions in order to explain the level of inequality in EI benefit weeks paid to the labour force.

A. The Data

Our sample covers the period from 1966 to 2008. Selected descriptive statistics of the data are presented in Appendix D: Table D1 and Figures D1 through D6. Over the period of analysis, the labour force gradually increased from fewer than 7.5 million individuals in 1966 to more than 18 million individuals in 2008. The average annual growth was relatively higher before 1981, due to the baby boom generation entering the labour force. The labour force grew on average at a rate of approximately 3.3% per year. Since 1982, the average labour force growth is approximately 1.5% per year (Figure D2).

When the country was first divided into economic regions (ER) in 1971, the average number of individuals in the labour force of an ER, as measured by the ratio of national labour force to number of EI regions, decreased from 8 million in 1970 to around half a million individuals in 1971. With subsequent divisions, the average number of individuals in the labour force of an ER dropped to between 200,000 and 300,000. Since 2000, an ER has on average around 270,000 individuals in the labour force (Figure D3).

The characteristics of the labour force have also evolved over the years. The proportion of women in the labour force increased from lows of 30% in the 1960s to around 47% in 2008 (Figure D4). The relative share of youth (individuals aged 15-24) has decreased on the other end from a high of around 28% in the late 1970s to 18% in 2008.

Part-time work in total employment has also doubled from less than 10% in the late 1960s to close to 20% since the second half of the 1990s. The evolutions of the shares of youth in the labour force and of part-time employment are also presented in Figure D4.

These changes in the characteristics of the labour force had some influence on some of the changes to the EI program. In 1971, special benefits including maternity, sickness and retirement benefits, and in 1984 the earlier form of parental benefits, were added to the UI program. The 1996 *EI Act* also extended coverage to a higher proportion of part-time employed by changing to an hours-based system in which insurability started from the first dollar earned. Preliminary studies suggested that the change to an hours-based system in 1996 made close to 500,000 part-time workers insurable for the first time.[27] In 2004, given Canada's aging population and more (women) workers balancing the demands of work and family, the EI compassionate care benefit was added to the group of special benefits offered. One would expect that the changes in the characteristics of the labour force and in the number of EI regions would influence the amount of EI benefits paid (both regular and special benefits).

We also expect the business cycles to influence the distribution of benefit weeks paid to the labour force. The major oil shocks of the late 1970s did have a big impact on Canada's economic and social situation. Canada's gross domestic product (GDP) growth was positive though lower (Figure D5). The average national unemployment rate rose to 8.1% in 1978. The UI account had over the previous years a positive and growing cumulative balance, which helped it to weather the increase in program costs due to the increase in the number of claims and benefits paid. The UI account balance grew more in

[27] HRDC (1995b).

1978 even by maintaining the employee premium rate lowered in 1977. By 1979, the cumulative UI surplus was $650 million and the national unemployment rate decreased to 7.4%. That year, the employee premium rate was lowered again.

In the early 1980s, Canada's unemployment rate increased by more than half to 12% in 1983, driving the number of claims up. While premiums had been slightly reduced in 1982 in light of a stable economic forecast, program costs doubled, such that the UI account posted a cumulative deficit of $3.9 billion in 1983. In 1982, annual GDP growth was negative at -2.9% from the previous year level. To curtail the burgeoning UI account deficit, premiums were increased by 40% in 1983 to a rate of $2.30 and then frozen for 1984 so not to act as a disincentive for employers and employment. The government contributions to the UI account were also increased by 58% to $2.8 billion in 1983. By 1988, the national unemployment rate was down back to almost its pre-1982 level, at around 7.8%. The UI account was again in a positive cumulative balance situation, and premiums had not increased much since 1983; the premium rate was $2.35 in 1988. The following year, the employee premium rate was decreased to $1.95 and the unemployment rate dropped to 7.5%.

The reprieve was short-lived, since the unemployment rate started rising again in 1990 with the recession of the early 1990s. This also coincided with the implementation of changes to the UI program when Bill C-21 became effective in 1991. It seems the timing of these UI program amendments were inopportune as premiums increased before the start of a recession or in the middle of the recession, in part to cope with the increase in the number of claims. In 1991, annual GDP growth was negative at -1.9%. The employee premium rate increased in 1991, and again in 1992 to $3.00. In 1994, the

unemployment rate had reached 11.5%, and the cumulative UI account deficit was $5.9 billion.

The implications of the current recession, which started in late 2008, are not fully captured by our data. Figure D5 shows the early signs of negative output growth in 2008, with GDP level 0.3% lower than in 2007. The average unemployment rate for 2008 was approximately 6.1%, showing a slight increase from a 30-year low of 6.0% in 2007.[28] The monthly unemployment rate has been on the rise since October 2008. Over the past few months, the unemployment rate fluctuated between 8.4% in September 2009 and 8.6% in October 2009. It is 8.5% in November 2009.[29] The number of active EI regular benefit claims also increased on a month-to-month basis since October 2008 and was approximately 818,000 in September 2009.[30]

B. Econometric Modelling

Since we are trying to analyze how the changes in the number of EI economic regions over time influenced the inequality of EI benefit weeks paid, we start with a basic regression set-up. We use the computed Gini coefficients of the previous section as the dependent variable. One of the explanatory variables of utmost interest is the average size of the labour force for an EI region (labelled as LF_ER) in a given year. The variable LF_ER is calculated as the total labour force divided by the number of EI regions for each year *t*. By including this variable, we are controlling for variations in the relative sizes of EI regions because some regions such as major cities tend to have a higher populations

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[28] HRSDC (2009b).

[29] Statistics Canada, December 4, 2009, *The Daily – Latest Release from the Labour Force Survey.*

[30] Statistics Canada, November 24, 2009, release of *The Daily - Employment Insurance.*

than others. The variable LF_ER thus gives the average number of people in the labour force of an economic region in each of the 43 years. We include a dummy variable, labelled EIA_Reg_1997, in order to account for the major break in the data when we calculated the Gini coefficient. Data on EI reported *total* benefit weeks paid up to year 1996, and *regular* benefit weeks paid starting in 1997. We expect the break in the data series of EI benefit weeks paid to modify only the intercept of the regression. Due to the change in the Labour Force Survey questionnaire in 1976, historical labour force information before 1976 is not fully comparable to recent labour force estimates (LFS post-1976). However, since Statistics Canada made adjustments to the historical labour force estimates to make them at minimum comparable to labour force estimates obtained from the new LFS questionnaire, we do not assume this break in the data series to be a major impediment in our analysis. We do not model the change in the LFS. The regression equation is thus as follows:

$$\mathbf{Gini}_t = \alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \beta\, \mathbf{Ln(LF\_ER)}_t + \varepsilon_t$$

Overall, we have 43 observations (annual data from 1966 to 2008). We expect the coefficient of the average labour force size of an economic region β to be positive: an increase in the average labour force size of an economic region – due to labour force growth or a decrease in the number of EI regions – should yield more inequality in the economy or a higher Gini coefficient. In comparison, dividing the country into economic regions or introducing more EI regions in the EI system over time decreases the average labour force size of an economic region, and a positive β would generate a lower level of EI benefit inequality. Our reasoning on the sign of the coefficient β supposes that job opportunities are equally distributed across the country. On the other end, since job

opportunities are unequally distributed across the country, and given that the program is sensitive to this, we will add more variables to the model later. Nonetheless, from the present specification, we expect that an increase in the number of EI regions, ceteris paribus, should decrease benefit inequality, since the regions would receive on average more benefits paid [check if clear enough].

The results of this regression are presented in the first two columns of Table 5. All the coefficients are statistically significant at the 10% significance level or less.[31] From the results, the econometric equation failed to explain the variation in the Gini over the years. The estimated coefficient of the average size of an EI region is negative, suggesting a negative relationship between the average size of an EI region and the Gini. The estimated constant term suggests that the "steady-state" level of inequality in the economy is as high as 37%, which is higher than the 43-year average of the Gini coefficient of inequality of 29%. In addition, variations in the average size of an EI region did not modify the steady-state inequality level. Figure 9 shows the graph of the residuals of the regression. From the graph, one can see a cyclical trend that should be accounted for in a regression. Moreover, link tests for misspecification of the regression equation suggested that this regression is not well specified.

[31] One slight exception is the coefficient on the average size of an economic region which has a p-value of about 10.1%, but we overlook this result to later reject the regression as the coefficient estimate has the wrong sign based on our assumptions.

Table 5: OLS regression results, specifications no. 1 through 3

	Equation no.1		Equation no.2		Equation no.3	
Variable	Coeff. estimate (std. err in parentheses)	*Pr>|t|*	Coeff. estimate (std. err in parentheses)	*Pr>|t|*	Coeff. estimate (std. err in parentheses)	*Pr>|t|*
Gini,t-1	--		0.471 (0.169)	<0.01	0.724 (0.165)	<0.01
Gini,t-2	--		-0.144 (0.135)	0.29	-0.201 (0.119)	0.10
Constant	0.356 (0.042)	<0.01	0. 172 (0.064)	0.01	0.080 (0.062)	0.21
EIA_Reg_1997	0.014 (0.008)	0.07	0.020 (0.006)	<0.01	0.012 (0.005)	0.02
StrBr1974	--		0.035 (0.009)	<0.01	0.036 (0.008)	<0.01
StrBr1983	--		0.056 (0.009)	0.52	0.015 (0.008)	0.07
Ln(LF_ER)	-0.005 (0.003)	0.10	0.001 (0.003)	0.84	0.002 (0.003)	0.44
D.Ln_GDP	--		--	--	0.324 (0.095)	<0.01
Sample size	43		41		41	
R-sq	0.17		0.80		0.85	
Adj. R-sq	0.13		0.76		0.82	
F statistic	F(2, 40) = 4.20		F(6, 34) = 22.49		F(7, 33) = 26.99	
Prob > F	0.02		<0.01		<0.01	

Not statistically significant at either of 1%, 5% or 10% significance level

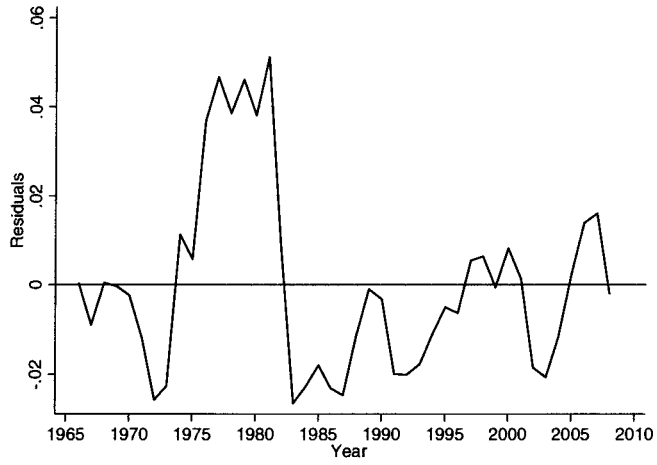

Figure 9: Residuals of specification no. 1, 1966-2008

Diagnostic tests for the presence of unit roots (DF-GLS and KPSS) in the data indicated that the Gini data series is difference-stationary. In addition, sequential unit root tests (Clemente-Montañés-Reyes, CMR here forth) allowing for two shifts in the mean in the Gini series suggested several structural breaks.[32] We run the CMR unit root test by considering the entire data series and then by separating the data series around the known 1976 and 1997 breaks in the data. The reader can refer to the tables and graphs presented in Appendix E for the results of these tests. The sequential runs of the CMR test did not suggest consistently the same breakpoints. The breaks suggested include the years 1968, 1971, 1974, 1978, 1979, 1980, 1983, 2000, 2001, 2004. Obviously, we cannot include all these breaks in the regression equation. We make a more informed decision based on the series graph of the Gini (the same conclusions are obtained by using the graph of residuals above). The additional breaks we select to include are 1974 and 1983 because the graph shows a clear change in the estimated Gini around these years. We don't include the other structural breaks in our equations as we do not want to strip the Gini data series of too much of its information, since it is that information we are trying to model here.

Other conclusions of the tests for unit roots, allowing or not for structural breaks, suggested the Gini data series was AR(1) and in one instance AR(2) (Table D2 of Appendix E). We therefore include two lags of the Gini coefficient as explanatory variables, and dummy variables for a change in the intercept. We define StrBr1974 as

[32] For a reference on the Clemente-Montañés-Reyes unit root test, the reader can refer to Clemente, Montañés and Reyes (1998), "Testing for a unit root in variables with a double change in the mean," *Economics Letters* 59, 175-182. Author -written codes we used in Stata are "Clemao2" and "Clemio2", computing respectively, additive outlier (AO) and innovative outlier (IO) unit-root test.

equal to 1 for years 1974 to 1982, and StrBr1983 as equal to 1 for years 1983 to 2008. The regression equation for this step is the following (no. 02):

$$\mathbf{Gini}_t = \aleph_1 \mathbf{Gini}_{t-1} + \aleph_2 \mathbf{Gini}_{t-2} + (\alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \alpha_3 \mathbf{StrBr1974} + \alpha_4 \mathbf{StrBr1983}) + \beta \mathbf{Ln(LF\_ER)}_t + \varepsilon_t$$

The results of this regression are presented in the second two columns of Table 5. We see an increase in the power of the test as measured by the adjusted-R^2 from 13% to 76%. However, the coefficient of the average size of an economic region along with those of two other variables is not statistically different from zero at the 10% significance level. The other variables are the second lag of the Gini and the dummy for a structural break in 1983. All the other coefficient estimates are significant at the 1% significance level. The residuals are also smaller in absolute value, suggesting that errors in the estimation have decreased (Figure 10). The high R^2 should be taken with caution, as high R^2 statistics in time-series regressions are often a sign for spurious regressions – the variables tend to be co-trended.

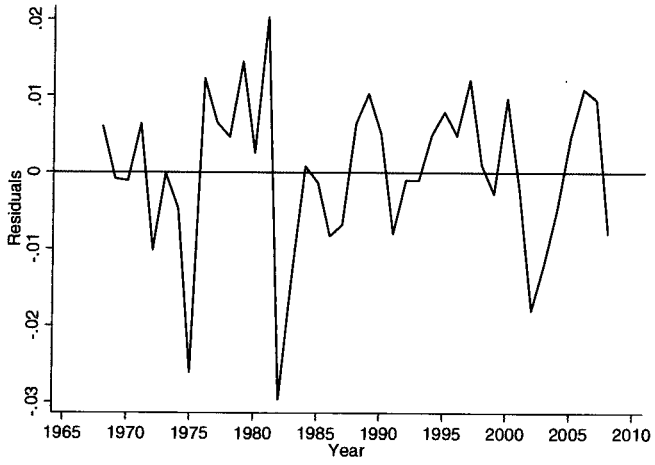

Figure 10: Residuals of specification no. 2, 1966-2008

This last reported regression contained relatively more dummy variables than quantitative variables. This could explain why some coefficients of variables are not significantly different from zero. Moreover, the wave-like pattern that we observe in the Gini data series (also in the graphs of the residuals) suggests one should consider controlling for possible causes of a cyclical trend in the data. To do this, we suggest introducing the difference in the log of Canadian gross domestic product (ln_GDP) in the regression equation. This will serve as a proxy for annual economic growth and control for cyclicality in the Gini data series. We expect that the coefficient γ on this variable will be positive, as in times of recession – negative or slower growth – the Gini coefficient should decrease or equivalently inequality in access to the program should decrease. A channel for the transmission of economic activity to equality of EI benefits is the VER: in times of slower or negative growth, workers can qualify for benefit with lower entrance requirements and more benefit weeks (and dollar amount) can be paid to the labour force. The regression equation (no. 3) is as follows:

$$\mathbf{Gini}_t = \aleph_1 \mathbf{Gini}_{t-1} + \aleph_2 \mathit{Gini}_{t-2} + (\alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \alpha_3 \mathbf{StrBr1974} + \alpha_4 \mathbf{StrBr1983}) + \beta \ln(\mathbf{LF\_ER})_t + \gamma (\mathbf{ln\_GDP}_t - \mathbf{ln\_GDP}_{t-1}) + \varepsilon_t$$

The results of this regression are presented in last two columns of Table 5. The coefficient on the average size of an economic region is still not statistically significant at the 10% significance level, but its statistical significance improved. The only other term that is not statistically different from zero is the constant term. All the other coefficient estimates are statistically significant at less than the 1% significance level or at the 10% significance level. The R^2 statistic remains high (82%). The residuals are also smaller compared to the previous specification, and range within 2 percentage points from zero (Figure 11) suggesting that the errors in the estimation have decreased.

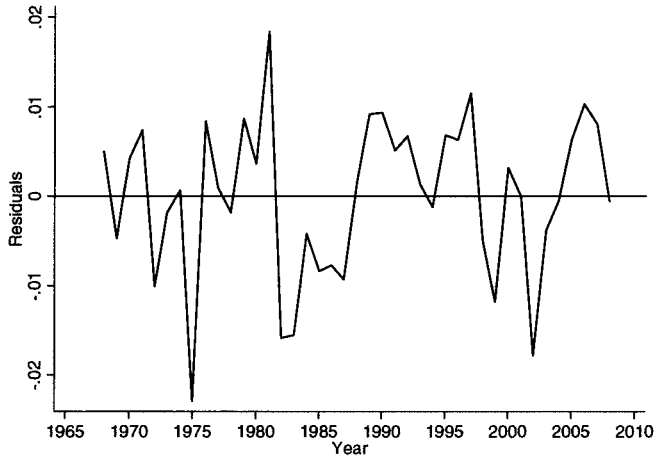

Figure 11: Residuals of specification no. 3, 1966-2008

Including the share of women in the labour force (Women_share), and the proportion of part-time work in total employment (Part-Time_share) in the regression equation (regression no. 4 below) makes the variable for the average size of an economic region statistically significant at the 5% significance level.

$$\begin{aligned}\mathbf{Gini}_t = {} & \aleph_1 \mathbf{Gini}_{t-1} + \aleph_2 Gini_{t-2} + (\alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \alpha_3\, \mathbf{StrBr1974} \\ & + \alpha_4 \mathbf{StrBr1983}) + \beta\, \ln(\mathbf{LF\_ER})_t + \gamma\, (\ln\_\mathbf{GDP}_t - \ln\_\mathbf{GDP}_{t-1}) \\ & + \vartheta_1 \mathbf{Women\_share}_t + \vartheta_2 \mathbf{Part-Time\_share}_t + s_t\end{aligned}$$

The results of this regression are presented in the first two columns of Table 6. The estimated coefficient on the average size of an economic region (Ln(LF_ER)) is statistically different from zero at the less than 5% significance level. The coefficient estimates of the constant term, the dummy variable for a break at year 1997 and the second lag of the Gini are not significant at the usual significance levels. We note the error in the estimation of this regression, as measured by the residuals, is even smaller, ranging in absolute value within 1.5 percentage points from zero (Figure 12).

Table 6: OLS regression results, specifications no. 4 through 6

Variable	Equation no.4 Coeff. estimate (std. err in parentheses)	Pr>|t|	Equation no.5 Coeff. estimate (std. err in parentheses)	Pr>|t|	Equation no.6 Coeff. estimate (std. err in parentheses)	Pr>|t|
Gini,t-1	0.481 (0.150)	<0.01	0.430 (0.152)	<0.01	0.489 (0.142)	<0.01
Gini,t-2	-0. 166[-] (0.100)	0.11	-0.243 (0.099)	0.02	-0. 184 (0.094)	0.07
Constant	-0.095[-] (0.077)	0.23	0.114 (0.048)	0.02	-0.020[-] (0.081)	0.81
EIA_Reg_1997	0.004[-] (0.005)	0.41	-0.033 (0.019)	0.09	0.006[-] (0.005)	0.24
StrBr1974	0.022 (0.008)	<0.01	0.026 (0.008)	<0.01	0.027 (0.008)	<0.01
StrBr1983	-0.027 (0.014)	0.06	-0.019[-] (0.014)	0.19	-0.017[-] (0.014)	0.22
Ln(LF_ER)	0.006 (0.003)	0.04	--	--	0.005 (0.003)	0.05
D.Ln_GDP	0.371 (0.088)	<0.01	0.312 (0.083)	<0.01	0.408 (0.085)	<0.01
Women share	0.677 (0.170)	<0.01	0.484 (0.166)	<0.01	0.550 (0.171)	<0.01
Part-time Share	-0.410 (0.236)	0.09	-0.679 (0.241)	<0.01	-0.602 (0.240)	0.02
VER_QP	--	--	0.244 (0.107)	0.03	--	--
Spread_QP	--	--	--	--	0.279 (0.128)	0.04
Sample size	41		41		41	
R-sq	0.90		0.91		0.92	
Adj. R-sq	0.87		0.88		0.89	
F statistic	F(9, 31) = 31.87		F(10, 30) = 32.34		F(10, 30) = 32.59	
Prob > F	<0.01		<0.01		<0.01	

[-] Not statistically significant at either of 1%, 5% or 10% significance level

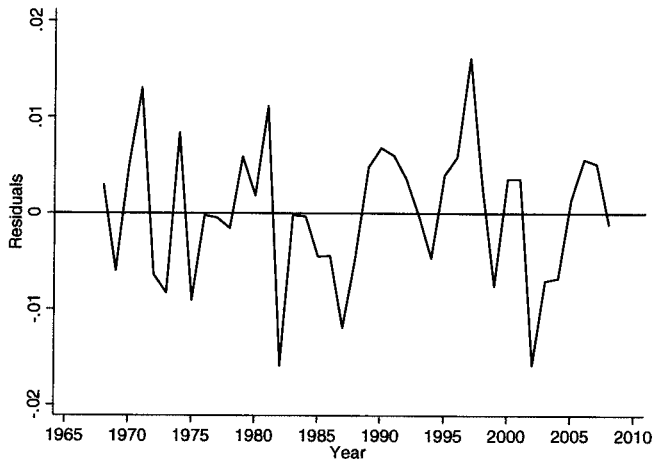

Figure 12: Residuals of specification no. 4, 1966-2008

The results suggest that benefit inequality increases by 0.6 percentage point for every percentage increase in the size of an EI region after controlling for the other factors considered. When the number of EI regions changed from 54 in 1996 to 58 in 2000, the average size of an EI region increased from 239,572 to 273,225 individuals, or equivalently increased by 13%. The regression suggests that benefit inequality increased by 13 percentage points, ceteris paribus. Appendix B indicates that benefit inequality actually increased by 2.7 percentage points from 1996 and 2000. The present regression overestimates the effect of a change in the average size of an EI region on the movement in benefit inequality over time.

Next, we introduce in the model all other relevant variables to control for changes in program parameters over the period. We include a measure of the average minimum work intensity required to qualify for EI at the average (VER_QP). This is the second variable of major interest in this paper. We remove the variable for the average size of an EI region (ln_LF_ER). The variable VER_QP is calculated as the VER (which is the same as the minimum entrance requirement before 1977) divided by the length of the

qualifying period (QP). The QP was 104 weeks before 1971, and 52 weeks since. The variable VER is given in weeks and all years are standardized to a 35 hour work-week. This makes the overall analysis more easily comparable to today's criteria. From 1997, the VER was converted into hours as it was discussed in Part *A* of Section III. Since then, the VER ranges from 420 to 700 hours. This is equivalent to a range from 12 to 20 weeks of 35 work-hours each.

So, the VER is equal to 6.9 weeks (=30 weeks * 8 hours / 35) to be accumulated over the 104-week QP until 1971. The 8-hour multiplier here reflects the fact that under the *UI Act* of 1955 workers could have a week of contribution with as little as a day of work. The VER then dropped significantly to 1.8 weeks (=8 weeks * 8 / 35) from 1971 to 1977. For the purpose of the analysis, the VER variable from 1978 to 2008 corresponds to the mid-point of the range of entrance requirement based on the regional unemployment rates. The VER variable thus increased to 5.1 weeks (12 weeks * 15 hours / 35) in 1978. Here, the 15-hour multiplier reflects the legislated minimum of a 15-hour work-week for the employment to be insurable that was implemented with the 1977 *UI Act*. The VER changed to 6.4 weeks, 6.9 weeks and 16 weeks in year 1990, 1994 and 1997, respectively. Figure D6 gives the evolution of the average minimum work intensity entitling for benefits (the VER / QP). The VER_QP ratio indicates that until the EI Reform in 1996, an individual was required to have insurable employment for a minimum of 5 to 15 percent in a year to be eligible for EI benefits. Since 1997, this ratio is 31 percent. The regression equation for this step is the following (no. 05):

$$\begin{aligned}\mathbf{Gini}_t = {} & \aleph_1 \mathbf{Gini}_{t-1} + \aleph_2 Gini_{t-2} + (\alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \alpha_3 \mathbf{StrBr1974} \\ & + \alpha_4 \mathbf{StrBr1983}) + \gamma\,(\mathbf{ln\_GDP}_t - \mathbf{ln\_GDP}_{t\ 1}) + \vartheta_1 \mathbf{Women\_share}_t \\ & + \vartheta_2 \mathbf{Part-Time\_share}_t + \eta \mathbf{VER\_QP}_t + \varepsilon_t\end{aligned}$$

We model the average minimum work intensity required to qualify for benefits on the basis of the EI program's policy rationale for dividing the country in economic regions representing the different labour market conditions. We thus consider that, once we account for the different economic outcomes of the regions and make benefits available according to the outcomes of the regions, we should see more workers or regions receiving adequate help from the EI program. This in turn should increase inequality in benefits paid. We expect the coefficient η to be positive.

The results of this regression are presented in the second two columns of Table 6. All but one (StrBr1983) of the coefficient estimates are statistically different from zero at a 10% significance level or less. The coefficient estimate η is statistically significant at a significance level of 5%. It is estimated that benefit inequality increases by 24 percentage points for every percentage increase in the average minimum work intensity entitling for benefits, ceteris paribus. The adjusted-R^2 statistic remained high and the residuals small (Figure 13). A graph of the fitted values of benefit inequality with the minimum work intensity entitling for benefits shows how benefit inequality compared over time with changes in the minimum work intensity entitling for benefits (Figure 14). The positive relationship between the two series is not strongly evident.

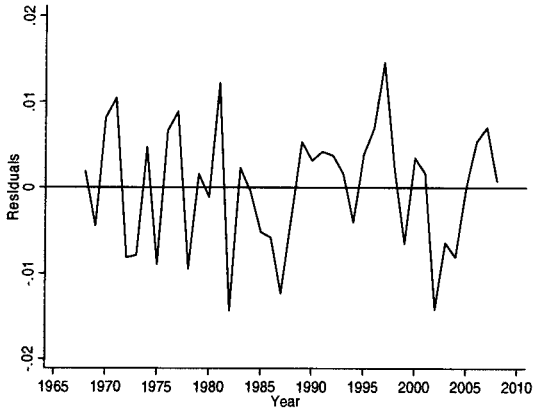

Figure 13: Residuals of specification no. 5, 1966-2008

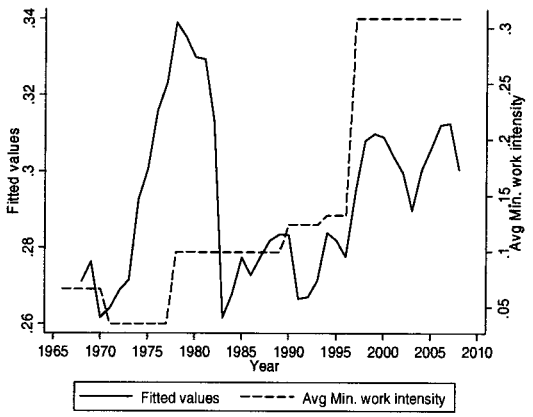

Figure 14: Average minimum work intensity and fitted values of specification no. 5, 1966-2008

In another regression that is not documented here, we added Sargent's generosity measure to the 4th specification as an alternative to the specification no. 5. This did not improve the explanatory power of the model. Both the generosity variable and the variable for the average size of an EI region were not statistically significant at the usual levels of significance. We conclude that the generosity of the EI program, as measured here by the maximum weeks a minimally-qualified individual could get, does not seem to influence inequality in the distribution of benefits. However, given the limits of this measure, it is possible that if other measures of generosity of EI were developed, results could be different. Such measures could incorporate the range of entrance requirements relative to the range of benefit weeks payable.

In this final specification, we attempt to control for the effect of the spread in the entrance requirement. This is at the heart of the program's policy on regional differentiation. We define a variable measuring the spread in work intensity entitling for benefits (Spread_QP). This variable is equal to zero up to 1977 as the entrance

requirement was uniform up until that time. The introduction of the VER starting in 1978 creates a spread in work intensity ranging between 3% and 8% (Figure D6). In the regression model, we re-introduce the variable for the average size of the labour force of an EI region. We remove the variable for the average minimum work intensity as it was not statistically significant at the usual levels of significance in the specification. The regression equation for this step is the following (no. 06):

$$\begin{aligned} \mathbf{Gini}_t - \aleph_1 \mathbf{Gini}_{t-1} + \aleph_2 Gini_{t-2} + (\alpha_1 + \alpha_2 \mathbf{EIA\_Reg\_1997} + \alpha_3 \mathbf{StrBr1974} \\ + \alpha_4 \mathbf{StrBr1983}) + \beta \ln(\mathbf{LF\_ER})_t + \gamma (\ln\mathbf{\_GDP}_t - \ln\mathbf{\_GDP}_{t-1}) \\ + \vartheta_1 \mathbf{Women\_share}_t + \vartheta_2 \mathbf{Part\_Time\_share}_t + \eta \, \mathbf{Share\_QP}_t + \varepsilon_t \end{aligned}$$

The results of this regression are presented in the last two columns of Table 6 and suggest that the model is relatively well specified. We adopt this last specification to explain the evolution of benefit inequality over time. All the coefficient estimates, except for the constant term and the dummy variable for a change in the intercept in 1997, are statistically different from zero at a 10% significance level or less. It is estimated that a one percentage point increase in the spread of the VER increases benefit inequality by 28 percentage points. On the other end, when the labour force size of an EI region increases by one percent, benefit inequality is estimated to increase by less than 1 percentage point. The adjusted-R^2 statistic remained high and the residuals small (Figure 15). A graph of the fitted values of benefit inequality with the spread in work intensity entitling for benefits shows how benefit inequality compared over time with changes in the entrance requirements entitling for benefits (Figure 16).

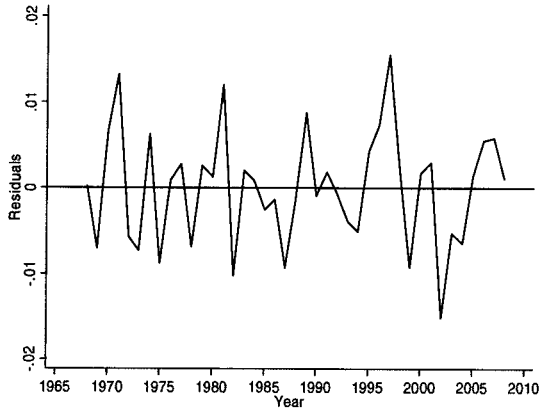

Figure 15: Residuals of specification no. 6, 1966-2008

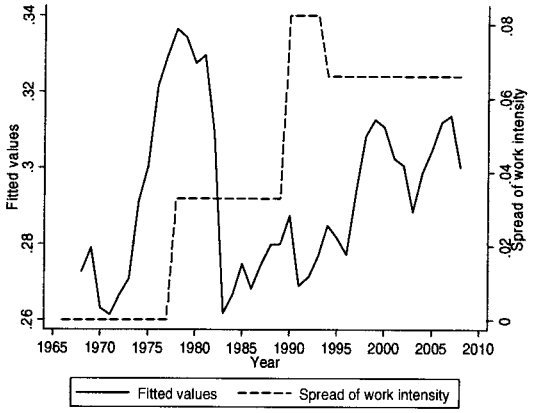

Figure 16: Spread in work intensity and fitted values of specification no. 6, 1966-2008

Overall, the different regressions suggest that while dividing the country into economic regions of relatively homogenous labour markets conditions may have helped to lower benefit inequality overall, the effect seems small. From 1970 to 1971, benefit inequality is estimated to be only 1.4 percentage points lower than it would have been had the country remained one economic region. In the following years, the estimated effects of the variation in the number of economic regions are given in Table 7, based on the estimate of 0.5 percentage point increase in benefit inequality for every percent growth of the average size of an economic region. After 1971, dividing the country into more or fewer economic regions suggest that benefit inequality varied by less than 1 percentage point. The spread in the entrance requirement entitling for benefits is estimated to be a major contributor of the evolution of benefit inequality, as it was mentioned earlier.

Table 7: Effect on benefit inequality of changes in the average size of an EI region, based on the specification no. 6, 1971, 1978, 1990, 1996 and 2000

Year	Average Labour Force Size of an EI Region (in Natural Log)	Change in Log of Average Labour Force Size	Change in the Average Labour Force Size of an EI Region (individuals)	Estimated Average Effect on Benefit Inequality (percentage points)
1970	15.93			
1971	13.18	-2.74	- 1,423,777	-1.37
1977	13.42			
1978	12.36	-1.06	- 53,487	-0.53
1989	12.59			
1990	12.60	0.01	309	0.01
1995	12.38			
1996	12.39	0.01	213	0.01
1999	12.57			
2000	12.52	-0.05	- 1,263	-0.03

We do not present regression results for the Theil coefficient because the regressions were not informative. In a regression with the Theil coefficient as the dependent variable, the coefficient estimates of our specification of choice (no. 6) were not statistically significant at the usual levels of significance. For future research, one could think of analysing the impact of the disqualification rules regarding dismissals for misconduct and voluntary quits. Preliminary tests for the inclusion of such a variable were not conclusive. The estimated coefficient was not statistically different from zero at the usual levels of significance, and the p-value for the test of individual significance of the coefficient estimate was around 90 percent.

VII. CONCLUSIONS

Since 1940, the Employment Insurance (EI) program has been an important feature of Canada's income security system. The program provides temporary income replacement for workers when they become involuntary unemployed. Benefits offered include *regular benefits* paid in times of involuntary unemployment and *special benefits* for workers who become temporary unemployed for sickness and family-related reasons such as parenthood (maternity and parental), sickness and compassionate care.

Over time, the changes to the income replacement program included the introduction of regional differentiation in the 1970s. Workers face different entrance requirements to be eligible for benefits and receive different amount of benefits based on the unemployment rate in their region of residence. Since the *EI Act* of 1996, entrance requirement were converted from work-weeks to work-hours, ranging from as low as 420 hours, where the regional unemployment rate is higher than 13%, to 700 hours where the regional unemployment rate is 6% or lower. To apply the regional differentiation in the program, the country has been divided into EI economic regions of homogenous labour market conditions. Since 2000, there are 58 EI regions in Canada.

This paper analyzed the inequalities in the regional differentiation of EI regular benefit weeks paid to the labour force. Given the multiple ramifications that exist in the EI program, the paper only analyzed regular benefits in the EI program, and did not model program interactions between EI regular benefits and EI special benefits nor between the EI benefit programs and the EI employment support program. Also it did not take the distribution of premiums into account. Our analysis covers the period from 1966

to 2008. Over that period, the composition of the labour market has changed. The proportion of women in the labour force increased from lows of 30% in 1968 to about 47% in 2008. Part-time work in total employment doubled from less than 10% in the late 1960s to a level of around 20% since the 1990s. These changes in the labour market partly influenced the shaping the EI program over time, such as in 1996, when close to half a million part-time workers became insured for the first time.

A major contribution of this paper was the application of an existing tool to a new field to obtain a benefit inequality indicator. The indicator measured the inequality in benefit weeks paid to the labour force using provinces as the units of analysis. The framework for developing this indicator is comparable to that of the Gini coefficient. On average, the inequality in EI benefit weeks paid was estimated at around 0.29 over the period of analysis. Our data included total EI benefit weeks before 1997 and EI regular benefit weeks paid thereafter because of availability. The findings suggested that benefit inequality among EI *regular* benefit weeks paid to the labour force is higher than inequality among *total* EI benefit weeks paid to the labour force. Before 1997, benefit inequality ranged between 0.26 and 0.34. Since 1997, benefit inequality ranged between 0.28 and 0.32. There exist alternative inequality indicators such as the Theil coefficient. The level of inequality measured using the Theil coefficient is relatively smaller than as measured using the Gini. Based on the Theil measure, EI benefit inequality is estimated to be approximately 10 percentage points lower than measured with the Gini measure.

Controlling for different program and labour force characteristics over the period, regression results on the Gini measure suggested that the average number of individuals in the labour force of an EI region is a relatively small factor in the level of inequality. On average, a one percent increase in the number of individuals in the labour force of a

given EI region increases benefit inequality (Gini) at the national level by less than 1 percentage point at the 5% significance level, ceteris paribus. As expected, the spread in the entrance requirement entitling for benefits was estimated to be a greater contributor to the variation of the Gini over time. It was measured as the spread in work intensity entitling for benefits: spread divided by the length of the qualifying period. It was estimated that benefit inequality increases by 0.29 when the spread in work intensity increases by one percentage point.

While dividing the country into economic regions of relatively homogenous labour markets conditions may have helped to lower benefit inequality overall, the effect seems small. In addition, the challenges in obtaining accurate unemployment rate statistics for smaller geographical areas suggest there is a limit to the number of EI regions that could be implemented. This is important to be able to have accurate labour market statistics to administer the EI program. The findings presented suggest that the VER increased inequality in benefit weeks paid to the labour force, ceteris paribus. We conclude that the policy discussion on the relevance of the regional differentiation in the EI program should revolve less around the number of EI regions to implement and more around the spread of the VER.

The current paper also raised issues of the availability of data for relevant research and public policy discussion. Certain statistics on the EI program at the regional level are not readily available. Only the most two recent monitoring and assessment reports of the EI program contained detailed statistics on the number of regular claims and benefit weeks paid on those claims at the EI region level. This lack of publicly available statistics poses a challenge for historical research, as it was the case here. As it was discussed, inequality measures are sensitive to the stratification of the data. Therefore, more accurate

estimates of benefit inequality could be obtained from using EI region-level data as compared to data at the provincial level. It would be interesting to compare our analysis using data at the EI region level and see whether benefit inequality evolved differently.

With recent theoretical developments in the inequality literature, it is possible to analyze whether inequality differs between or within subgroups of the population.[33] It would be worthwhile considering a decomposition approach of our benefit inequality estimates by certain characteristics. These characteristics could reflect either the demographics (age, gender) or parameters of the EI program such as the EI regions or the entrance requirement levels.

[33] For example, see Reardon and Firebaugh (2002) or Yitzhaki and Lerman (1991).

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Appendix A: List of EI economic regions, 1971-2008

1971		1978		1990		1996		2000	
UI Regional Code / UI Regional Name						EI Economic Number / EI Economic Name			
1	Vancouver - Victoria	1	Avalon Peninsula	1	St. John's	20	St. John's	01	St. John's
2	Southern B.C.	2	Fortune Bay - Gander	2	Newfoundland North East/ Labrador	21	Newfoundland/ Labrador	02	Newfoundland/ Labrador
3	Alberta	3	Corner Brook - Labrador	3	Corner Brook-Gander	23	P.E.I.	03	P.E.I.
4	Saskatchewan	4	P.E.I.	4	P.E.I.	24	Eastern Nova Scotia	04	Eastern Nova Scotia
5	Manitoba	5	Cape Breton	5	Eastern Nova Scotia	25	Central Nova Scotia	05	Western Nova Scotia
6	North Western Ontario	6	Cumberland - Guysborough	6	Central Nova Scotia	26	Halifax	06	Halifax
7	London - Windsor	7	Annapolis	7	Halifax	27	Kings	07	Fredericton-Moncton-Saint John
8	Toronto	8	Digby - Lunenburg	8	Kings	28	Yarmouth	08	Madawaska-Charlotte
9	Eastern Ontario	9	Halifax	9	Yarmouth	29	Fredericton-Moncton-Saint John	09	Restigouche-Albert
10	Montréal	10	Restigouche	10	Saint John	30	Restigouche-Charlotte	10	Gaspésie - Îles-de-la-Madeleine
11	Eastern Townships	11	Moncton	11	Fredericton	33	Eastern Quebec	11	Québec
12	St. Lawrence - Gaspé	12	St. John	12	Restigouche-Charlotte	34	Quebec	12	Trois-Rivières
13	New Brunswick and P.E.I.	13	Fredericton	13	Moncton	35	Trois-Rivières	13	South Central Quebec
14	Nova Scotia	14	Madawaska	14	Eastern Quebec	36	Quebec Centre-South	14	Sherbrooke
15	Island of Newfoundland	15	Gaspé	15	Quebec	37	Sherbrooke	15	Montérégie
16	Northern Canada	16	Québec	16	Quebec Centre North	38	Montérégie	16	Montreal
		17	Trois-Rivières	17	Trois-Rivières	39	Montreal	17	Central Quebec
		18	Eastern Townships	18	Quebec Centre South	40	Central Quebec	18	North Western Quebec
		19	Montréal	19	Sherbrooke	41	Western Quebec	19	Lower Saint Lawrence and North Shore
		20	Outaouais	20	Montérégie	42	Northern Quebec	20	Hull
		21	Northern Quebec	21	Montreal	43	Hull	21	Chicoutimi-Jonquière
		22	Eastern Ontario	22	Laurentides-Lanaudière	44	Chicoutimi-Jonquière	22	Ottawa
		23	Belleville - Peterborough	23	Western Quebec	46	Ottawa	23	Eastern Ontario
		24	Toronto	24	Hull	47	Eastern Ontario	24	Kingston
		25	Niagara	25	Northern Quebec	48	North Central Ontario	25	Central Ontario
		26	London	26	Chicoutimi-Jonquiere	49	Oshawa	26	Oshawa
		27	Windsor - Sarnia	27	Ottawa	50	Toronto	27	Toronto
		28	Kitchener	28	Eastern Ontario	51	Hamilton	28	Hamilton
		29	Georgian Bay	29	Belleville-Peterborough	52	St. Catharines	29	St. Catharines
		30	Sudbury - Sault-Ste-Marie	30	Oshawa	53	London	30	London
		31	Northwest Ontario	31	Toronto	54	Niagara	31	Niagara
		32	Southern Manitoba	32	Hamilton	55	Windsor	32	Windsor
		33	Winnipeg	33	St. Catharines	56	Kitchener	33	Kitchener
		34	Parkland	34	London	57	Huron	34	Huron
		35	Southern Saskatchewan	35	Niagara	58	South Central Ontario	35	South Central Ontario
		36	Saskatoon	36	Windsor	59	Sudbury	36	Sudbury
		37	Yorkton - Prince Albert	37	Kitchener	60	Thunder Bay	37	Thunder Bay
		38	South - Central Alberta	38	Durham-Simcoe	61	Northern Ontario	38	Northern Ontario
		39	Calgary	39	Huron	64	Winnipeg	39	Winnipeg
		40	Edmonton	40	South Central Ontario	65	Southern Manitoba	40	Southern Manitoba
		41	Northern Prairies	41	Algonquin	66	Northern Manitoba	41	Northern Manitoba
		42	The Kootenays	42	Sudbury	67	Regina	42	Regina
		43	Kelowna	43	Thunder Bay	68	Saskatoon	43	Saskatoon
		44	Kamloops	44	Northern Ontario	69	Southern Saskatchewan	44	Southern Saskatchewan
		45	Vancouver - Lower Fraser Valley	45	Winnipeg	70	Northern Saskatchewan	45	Northern Saskatchewan
		46	Victoria - Vancouver Island	46	Southern Manitoba	71	Calgary	46	Calgary
		47	Northern B.C.	47	Northern Manitoba	72	Edmonton	47	Edmonton
		48	Watson Lake	48	Regina	73	Southern Alberta	48	Northern Alberta
				49	Saskatoon	75	Southern Interior B.C.	49	Southern Alberta
				50	Southern Saskatchewan	76	Vancouver	50	Southern Interior B.C.
				51	Northern Saskatchewan	77	Victoria	51	Abbotsford
				52	Calgary	78	Southern Coastal B.C.	52	Vancouver
				53	Edmonton	79	Northern B.C.	53	Victoria
				54	Southern Alberta	81	Yukon - Northwest Territories	54	Southern Coastal B.C.
				55	Northern Alberta			55	Northern B.C.
				56	Southern B.C.			56	Yukon
				57	Upper Fraser Valley			57	Northwest Territories
				58	Vancouver			58	Nunavut
				59	Victoria				
				60	Vancouver Island				
				61	Northern B.C.				
				62	Yukon--Northwest Territories				

Appendix B: Measures of inequality in payment of EI benefits weeks, with provincial labour force shares as weights, 1966-2008

	Gini coefficient	Theil coefficient*	Theil Index, *T*
1966	27.3%	16.2%	17.7%
1967	26.4%	17.2%	18.9%
1968	27.3%	17.4%	19.1%
1969	27.2%	17.2%	18.9%
1970	27.0%	16.9%	18.5%
1971	27.5%	16.5%	18.0%
1972	26.1%	16.1%	17.5%
1973	26.4%	16.2%	17.6%
1974	29.7%	18.2%	20.1%
1975	29.2%	19.1%	21.2%
1976	32.2%	20.1%	22.4%
1977	33.2%	20.1%	22.5%
1978	33.0%	19.7%	21.9%
1979	33.7%	20.3%	22.7%
1980	32.9%	20.6%	23.0%
1981	34.2%	20.8%	23.4%
1982	29.9%	17.6%	19.4%
1983	26.4%	15.0%	16.3%
1984	26.7%	14.0%	15.1%
1985	27.2%	14.2%	15.3%
1986	26.7%	13.3%	14.3%
1987	26.5%	12.8%	13.7%
1988	27.8%	13.5%	14.5%
1989	28.9%	14.1%	15.2%
1990	28.7%	15.1%	16.4%
1991	27.1%	15.7%	17.1%
1992	27.1%	15.7%	17.0%
1993	27.3%	15.5%	16.8%
1994	28.0%	15.4%	16.8%
1995	28.6%	15.4%	16.8%
1996	28.5%	15.3%	16.6%
1997	*30.9%*	*17.1%*	*18.8%*
1998	*31.0%*	*16.4%*	*17.9%*
1999	*30.3%*	*15.3%*	*16.5%*
2000	*31.2%*	*16.1%*	*17.5%*
2001	*30.5%*	*16.3%*	*17.8%*
2002	*28.5%*	*15.0%*	*16.2%*
2003	*28.3%*	*14.9%*	*16.2%*
2004	*29.2%*	*15.7%*	*17.1%*
2005	*30.6%*	*17.1%*	*18.8%*
2006	*31.8%*	*18.5%*	*20.4%*
2007	*32.0%*	*19.1%*	*21.2%*
2008	*30.1%*	*18.5%*	*20.5%*

The Gini and Theil indices are computed using Jenkins (2008) "ineqdeco" written code for use in Stata.
Pre-1996 uses total benefit weeks paid, 1997-2008 uses regular benefit weeks paid.
* The Theil coefficient is obtained from the Theil index T as: 1-exp(-T)

Appendix C: EI benefit weeks paid by province and provincial labour force, selected years between 1966 and 2008

Year	Province	EI benefit weeks paid	Labour Force (LF)	Average weeks of EI benefit paid to an individual in the LF	Percentage of EI benefit Weeks Paid	Percentage of Labour Force
1966	Alberta	487,727	552,000	0.88	4%	7%
1966	Saskatchewan	360,620	324,000	1.11	3%	4%
1966	Ontario	3,365,285	2,729,000	1.23	28%	37%
1966	Manitoba	477,491	353,000	1.35	4%	5%
1966	Quebec	3,813,491	2,112,000	1.81	32%	29%
1966	British Columbia	1,313,132	707,000	1.86	11%	10%
1966	Nova Scotia	701,147	242,000	2.90	6%	3%
1966	New Brunswick	683,515	196,000	3.49	6%	3%
1966	Prince Edward Island	126,112	36,000	3.50	1%	0%
1966	Newfoundland	712,720	133,000	5.36	6%	2%
1970	Alberta	947,496	643,000	1.47	5%	8%
1970	Saskatchewan	629,791	339,000	1.86	3%	4%
1970	Manitoba	736,001	380,000	1.94	4%	5%
1970	Ontario	6,523,366	3,106,000	2.10	33%	38%
1970	Quebec	6,065,863	2,294,000	2.64	31%	28%
1970	British Columbia	2,441,972	859,000	2.84	12%	10%
1970	Nova Scotia	807,180	260,000	3.10	4%	3%
1970	Prince Edward Island	133,739	36,000	3.71	1%	0%
1970	New Brunswick	783,110	206,000	3.80	4%	2%
1970	Newfoundland	748,513	141,000	5.31	4%	2%
1971	Saskatchewan	643,055	338,000	1.90	3%	4%
1971	Alberta	1,266,359	655,000	1.93	6%	8%
1971	Ontario	7,558,324	3,215,000	2.35	33%	38%
1971	Manitoba	1,055,857	390,000	2.71	5%	5%
1971	Quebec	6,673,689	2,355,000	2.83	29%	28%
1971	British Columbia	2,544,751	886,000	2.87	11%	10%
1971	Nova Scotia	1,003,956	265,000	3.79	4%	3%
1971	Prince Edward Island	151,893	39,000	3.89	1%	0%
1971	New Brunswick	920,377	210,000	4.38	4%	2%
1971	Newfoundland	813,812	150,000	5.43	4%	2%
1976	Alberta	859,806	890,000	0.97	2%	8%
1976	Saskatchewan	544,839	397,700	1.37	2%	4%
1976	Manitoba	746,808	455,600	1.64	2%	4%
1976	Ontario	9,957,752	3,985,500	2.50	28%	38%
1976	British Columbia	4,116,598	1,158,700	3.55	11%	11%
1976	Quebec	13,576,451	2,785,500	4.87	38%	27%
1976	Nova Scotia	1,755,150	328,000	5.35	5%	3%
1976	New Brunswick	2,070,846	259,600	7.98	6%	2%
1976	Prince Edward Island	386,950	47,300	8.18	1%	0%
1976	Newfoundland	2,048,058	183,300	11.17	6%	2%
1977	Alberta	1,017,299	946,200	1.08	3%	9%
1977	Saskatchewan	684,112	413,500	1.65	2%	4%
1977	Manitoba	966,749	464,400	2.08	3%	4%
1977	Ontario	10,011,465	4,086,400	2.45	26%	38%
1977	British Columbia	4,173,853	1,188,300	3.51	11%	11%
1977	Quebec	14,725,896	2,852,000	5.16	38%	26%
1977	Nova Scotia	2,057,066	332,700	6.18	5%	3%
1977	New Brunswick	2,290,865	263,300	8.70	6%	2%
1977	Prince Edward Island	423,078	48,200	8.78	1%	0%
1977	Newfoundland	2,231,248	190,300	11.72	6%	2%

Year	Province	EI benefit weeks paid	Labour Force (LF)	Average weeks of EI benefit paid to an individual in the LF	Percentage of EI benefit Weeks Paid	Percentage of Labour Force
1989	Ontario	10,924,200	5,473,000	2.00	21%	39%
1989	Alberta	4,051,910	1,348,000	3.01	8%	10%
1989	Saskatchewan	1,513,270	492,600	3.07	3%	4%
1989	Manitoba	1,851,140	554,100	3.34	3%	4%
1989	British Columbia	6,925,000	1,659,300	4.17	13%	12%
1989	Quebec	17,605,410	3,461,200	5.09	33%	25%
1989	Nova Scotia	2,734,770	423,300	6.46	5%	3%
1989	New Brunswick	2,995,490	337,600	8.87	6%	2%
1989	Prince Edward Island	700,860	63,700	11.00	1%	0%
1989	Newfoundland	3,921,890	244,100	16.07	7%	2%
1990	Ontario	14,040,100	5,535,700	2.54	25%	39%
1990	Alberta	3,783,080	1,370,900	2.76	7%	10%
1990	Saskatchewan	1,383,990	488,600	2.83	2%	3%
1990	Manitoba	1,785,620	554,600	3.22	3%	4%
1990	British Columbia	6,726,080	1,703,000	3.95	12%	12%
1990	Quebec	18,802,320	3,505,400	5.36	33%	25%
1990	Nova Scotia	2,874,230	431,400	6.66	5%	3%
1990	New Brunswick	3,005,570	341,500	8.80	5%	2%
1990	Prince Edward Island	676,970	64,400	10.51	1%	0%
1990	Newfoundland	3,793,910	249,200	15.22	7%	2%
1993	Saskatchewan	1,568,600	489,100	3.21	2%	3%
1993	Alberta	4,803,210	1,425,900	3.37	7%	10%
1993	Ontario	19,278,560	5,543,500	3.48	28%	38%
1993	Manitoba	1,994,230	555,600	3.59	3%	4%
1993	British Columbia	7,708,960	1,847,800	4.17	11%	13%
1993	Quebec	21,473,340	3,493,700	6.15	31%	24%
1993	Nova Scotia	3,334,680	427,900	7.79	5%	3%
1993	New Brunswick	3,460,840	343,200	10.08	5%	2%
1993	Prince Edward Island	841,750	65,700	12.81	1%	0%
1993	Newfoundland	3,741,420	242,500	15.43	5%	2%
1994	Saskatchewan	1,295,620	488,000	2.65	2%	3%
1994	Alberta	4,138,530	1,452,200	2.85	7%	10%
1994	Ontario	15,952,837	5,548,200	2.88	27%	38%
1994	Manitoba	1,664,010	556,300	2.99	3%	4%
1994	British Columbia	6,585,820	1,918,400	3.43	11%	13%
1994	Quebec	18,866,510	3,529,900	5.34	32%	24%
1994	Nova Scotia	3,155,440	430,700	7.33	5%	3%
1994	New Brunswick	3,244,380	341,400	9.50	6%	2%
1994	Prince Edward Island	759,910	66,800	11.38	1%	0%
1994	Newfoundland	3,207,200	241,800	13.26	5%	2%
1995	Saskatchewan	1,087,420	491,100	2.21	2%	3%
1995	Ontario	13,208,820	5,589,100	2.36	26%	38%
1995	Alberta	3,594,100	1,480,800	2.43	7%	10%
1995	Manitoba	1,443,340	556,900	2.59	3%	4%
1995	British Columbia	5,749,670	1,950,900	2.95	11%	13%
1995	Quebec	16,522,620	3,540,900	4.67	33%	24%
1995	Nova Scotia	2,572,160	427,900	6.01	5%	3%
1995	New Brunswick	2,837,310	347,200	8.17	6%	2%
1995	Prince Edward Island	687,700	67,100	10.25	1%	0%
1995	Newfoundland	2,577,220	237,100	10.87	5%	2%
1996	Alberta	1,894,880	1,509,400	1.26	7%	10%
1996	Ontario	7,209,830	5,680,200	1.27	26%	38%
1996	Saskatchewan	631,900	489,600	1.29	2%	3%
1996	Manitoba	792,220	558,000	1.42	3%	4%
1996	British Columbia	3,201,630	1,988,400	1.61	12%	13%
1996	Quebec	9,023,550	3,551,700	2.54	33%	24%

Year	Province	EI benefit weeks paid	Labour Force (LF)	Average weeks of EI benefit paid to an individual in the LF	Percentage of EI benefit Weeks Paid	Percentage of Labour Force
1996	Nova Scotia	1,408,080	430,100	3.27	5%	3%
1996	New Brunswick	1,619,010	345,500	4.69	6%	2%
1996	Prince Edward Island	397,820	68,900	5.77	1%	0%
1996	Newfoundland	1,488,200	231,700	6.42	5%	2%
1997	Alberta	1,768,840	1,542,600	1.15	5%	10%
1997	Saskatchewan	622,010	495,700	1.25	2%	3%
1997	Ontario	8,522,780	5,776,400	1.48	25%	38%
1997	Manitoba	867,450	562,100	1.54	3%	4%
1997	British Columbia	3,909,210	2,030,600	1.93	12%	13%
1997	Quebec	11,919,450	3,582,300	3.33	35%	24%
1997	Nova Scotia	1,784,420	435,100	4.10	5%	3%
1997	New Brunswick	2,074,570	354,100	5.86	6%	2%
1997	Prince Edward Island	538,340	69,400	7.76	2%	0%
1997	Newfoundland	1,939,450	230,900	8.40	6%	2%
2000	Ontario	5,561,220	6,172,700	0.90	21%	39%
2000	Alberta	1,588,600	1,666,800	0.95	6%	11%
2000	Saskatchewan	650,590	499,200	1.30	2%	3%
2000	Manitoba	775,330	581,100	1.33	3%	4%
2000	British Columbia	3,059,770	2,079,900	1.47	11%	13%
2000	Quebec	9,356,230	3,717,500	2.52	35%	23%
2000	Nova Scotia	1,631,860	452,800	3.60	6%	3%
2000	New Brunswick	1,863,920	368,000	5.07	7%	2%
2000	Prince Edward Island	485,470	71,300	6.81	2%	0%
2000	Newfoundland	1,925,160	237,800	8.10	7%	2%
2005	Alberta	1,323,350	1,857,500	0.71	5%	11%
2005	Ontario	7,154,070	6,849,100	1.04	25%	39%
2005	Saskatchewan	612,510	509,400	1.20	2%	3%
2005	Manitoba	734,140	609,400	1.20	3%	4%
2005	British Columbia	2,802,320	2,263,400	1.24	10%	13%
2005	Quebec	9,679,490	4,052,700	2.39	34%	23%
2005	Nova Scotia	1,618,450	483,900	3.34	6%	3%
2005	New Brunswick	1,906,520	388,200	4.91	7%	2%
2005	Prince Edward Island	458,340	76,500	5.99	2%	0%
2005	Newfoundland	2,077,970	252,500	8.23	7%	1%
2007	Alberta	1,076,270	2,030,600	0.53	4%	11%
2007	British Columbia	2,150,580	2,366,400	0.91	8%	13%
2007	Manitoba	624,110	623,900	1.00	2%	3%
2007	Ontario	7,064,660	7,043,500	1.00	27%	39%
2007	Saskatchewan	534,490	523,800	1.02	2%	3%
2007	Quebec	9,220,130	4,150,100	2.22	35%	23%
2007	Nova Scotia	1,535,690	486,700	3.16	6%	3%
2007	New Brunswick	1,736,030	392,400	4.42	7%	2%
2007	Prince Edward Island	448,850	77,300	5.81	2%	0%
2007	Newfoundland	2,035,870	251,200	8.10	8%	1%
2008	Alberta	1,129,930	2,088,100	0.54	4%	11%
2008	Saskatchewan	491,370	534,700	0.92	2%	3%
2008	British Columbia	2,381,180	2,425,900	0.98	9%	13%
2008	Manitoba	638,690	633,000	1.01	2%	3%
2008	Ontario	7,693,010	7,154,500	1.08	29%	39%
2008	Quebec	8,816,000	4,184,900	2.11	33%	23%
2008	Nova Scotia	1,504,310	491,000	3.06	6%	3%
2008	New Brunswick	1,705,960	400,600	4.26	6%	2%
2008	Prince Edward Island	441,610	78,700	5.61	2%	0%
2008	Newfoundland	1,991,690	253,800	7.85	7%	1%

Appendix D: Selected descriptive statistics of the data, 1966-2008

Table D1: Selected descriptive statistics of the variables, data over 1966-2008

Variable	Number of obs. (default = 43)	Mean	Std. Dev.	Min	Max
Gini		0.29	0.02	0.26	0.34
Number of EI Economic Regions		41.65	20.99	1	62
VER		8.07	5.24	1.83	16
Generos_d1m1		3.37	1.32	1.50	5.50
GDP		7.80E+11	2.87E+11	3.49E+11	1.31E+12
Labour Force		1.30E+07	3,160,720	7,384,000	1.82E+07
Employment		1.20E+07	2,829,328	7,242,000	1.71E+07
Average Labour Force per Economic Region (LF_ER)		1,203,828	2,440,299	232,389.6	8,264,000
Ln(GDP)		27.31	0.39	26.58	27.90
GDP growth	42	0.03	0.02	-0.03	0.07
Ln(Labour Force)		16.35	0.26	15.81	16.72
Ln(LF_ER)		13.03	1.09	12.36	15.93
VER_QP		0.15	0.10	0.03	0.31
Spread_QP		0.04	0.03	0.00	0.08
Ln (EI Regular Benefit Weeks Paid)	12	17.19	0.08	17.09	17.34
Ln (Total EI Benefit Weeks Paid)	31	17.46	0.51	16.30	18.11
Youth share		0.21	0.04	0.16	0.28
Women share		0.41	0.05	0.30	0.47
Part-Time share		0.16	0.03	0.09	0.19
Participation rate	33	65.57	1.59	61.50	67.80

(Selected descriptive graphs are presented on the following page)

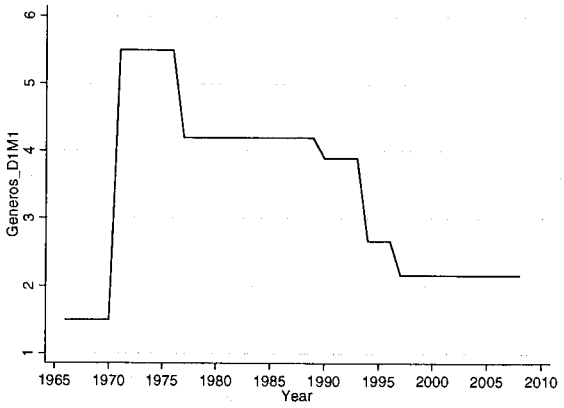


Figure D1: Sargent (1995)' generosity measure of EI: maximum benefit weeks to minimally qualified individual, 1966-2008

Figure D2: Labour force and average growth, 1966-2008

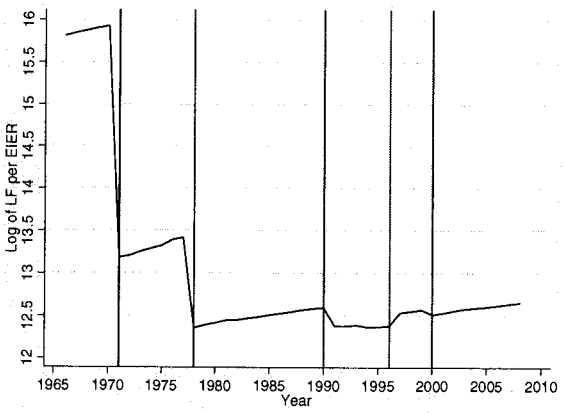


Figure D3: Average labour force size of an EI economic region, 1966-2008

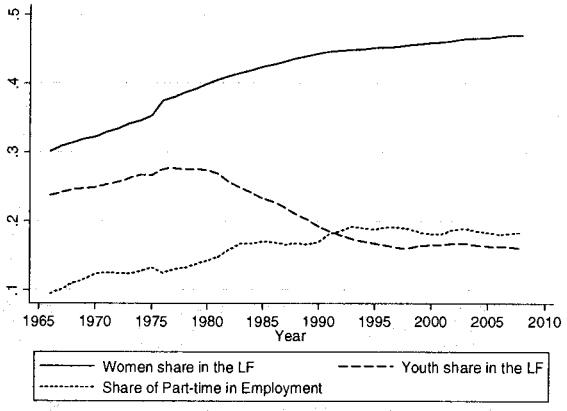


Figure D4: Shares of women and youth in the labour force, and Part-time Employment, 1966-2008

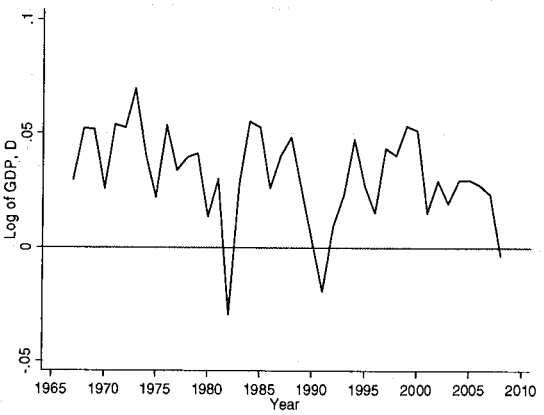


Figure D5: Average annual GDP growth, 1966-2008

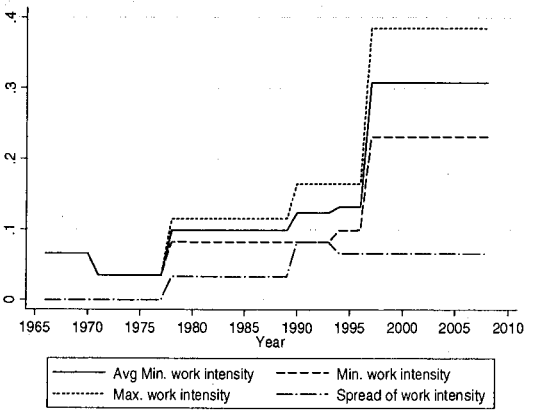


Figure D6: Work intensity in a year entitling for benefits, 1966-2008

Appendix E: Results of tests for unit roots and stationarity, data over 1966-2008

DF-GLS for Gini (i.e. benefit inequality)
Number of observations = 39

[lags]	DF-GLS tau Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
3	-2.857	-3.770	-3.129	-2.829
2	-2.437	-3.770	-3.188	-2.884
1	-2.503	-3.770	-3.239	-2.930

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC = -8.424665 at lag 1 with RMSE .0134837
Min MAIC = -8.182663 at lag 1 with RMSE .0134837

KPSS test for Gini (i.e. benefit inequality)

Maxlag = 9 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: Gini is trend stationary
10%: 0.119 5% : 0.146 2.5%: 0.176 1% : 0.216

Lag order	Test statistic
0	.254
1	.142
2	.105
3	.0878

(Results continued on next page)

The Clemente-Montañés-Reyes unit-root test with double mean shifts has two forms: an AO model and an IO model. Both models yielded approximately the same estimates and differed only in the proposed structural-break (SB) years. We therefore listed only the table estimates for the AO model but provided all proposed SB years.

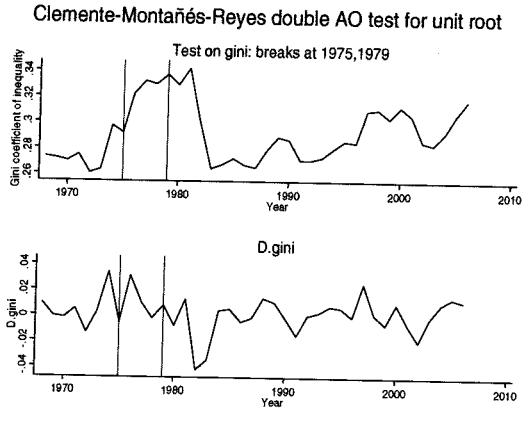
Clemente-Montañés-Reyes Unit-Root Tests with Double Mean Shifts on Gini (i.e. EI Benefit Inequality) (AO and IO models)

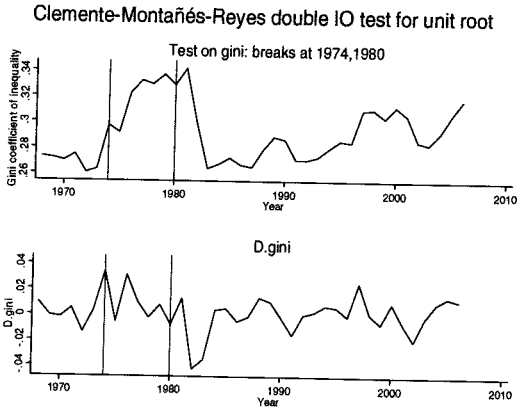
	Full sample		1966-75 sample		1976-96 sample		1997-2008 sample	
	Coefficient (t-stat)	p-value+	Coefficient (t-stat)	p-value+	Coefficient (t-stat)	p-value+	Coefficient (t-stat)	p-value+
du1	0.056 (5.22)	<0.01	0.003 (0.36)	0.73	-0.022 (-1.96)	0.07	-0.021 (-4.81)	<0.01
du2	-0.038 (-3.92)	<0.01	0.018 (1.35)	0.219	-0.032 (-3.55)	<0.01	0.024 (5.24)	<0.01
(rho-1)	-0.549 (-4.53)	-5.49	-1.440 (-4.03)	-5.49	-1.458 (-7.53)	-5.49	-1.527 (-4.23)	-5.49
Constant	0.274		0.271		0.330		0.308	
Optimal Breaks, AO:	1975 ; 1979		1971 ; 1974		1979 ; 1983		2001 ; 2004	
Optimal Breaks, IO:	1974 ; 1980		1968 ; 1971		1978 ; 1980		2000 ; 2004	
Sample size	39		10		19		10	

+The p-values are provided at the 5% significance level.

Graphs for the Clemente-Montañés-Reyes Unit-Root Tests

Full Sample: 1966-2008

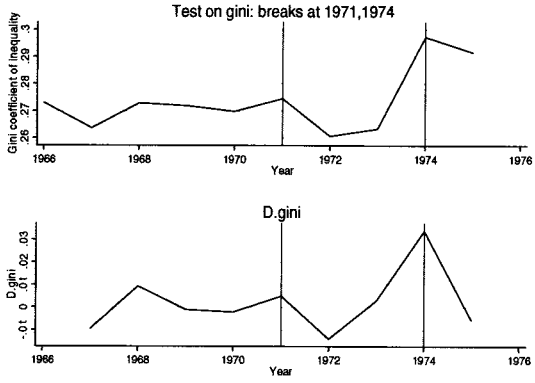




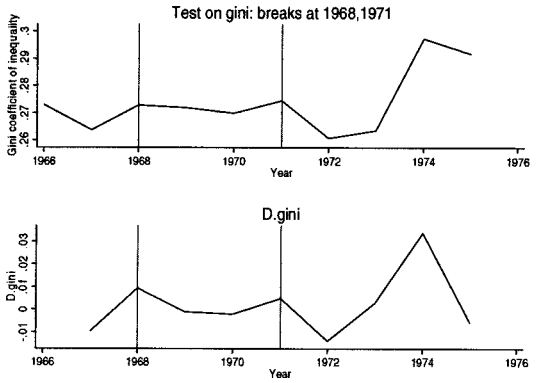
(Results continued on next page)

Sample: 1966-1975

Clemente-Montañés-Reyes double AO test for unit root

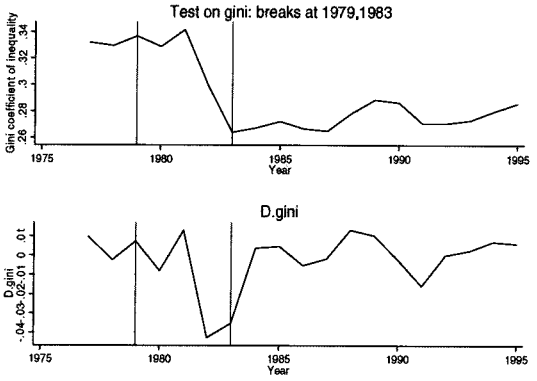


Clemente-Montañés-Reyes double IO test for unit root

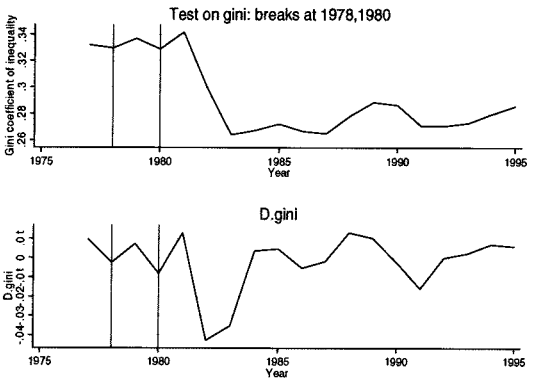


Sample: 1976-1996

Clemente-Montañés-Reyes double AO test for unit root

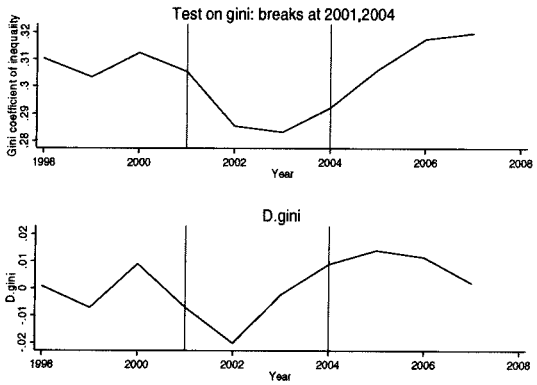


Clemente-Montañés-Reyes double IO test for unit root

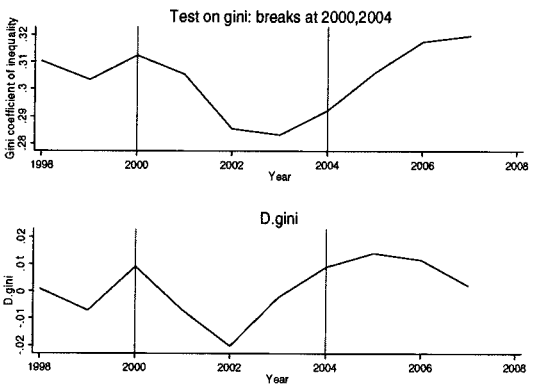


Sample: 1996-2008

Clemente-Montañés-Reyes double AO test for unit root



Clemente-Montañés-Reyes double IO test for unit root



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