UNIVERSIDAD ADOLFO IBÁÑEZ
ESCUELA DE NEGOCIOS

CENTRO DE ECONOMÍA
Y POLÍTICA REGIONAL
UNIVERSIDAD ADOLFO IBÁÑEZ

GLIS

Data Accuracy and Economic Modelling

The case of Chile's Labor Market

CONICYT
Ministerio de Educación
Gobierno de Chile

International Input-Output Association

Ruiz de Fora, 2018

Esteban Lopez
Patricio Aroca

GEFÖRDERT VOM
Bundesministerium
für Bildung
und Forschung

Outline

- Motivation
  - Data accuracy in economic modelling
- The problem
  - The changes in the Chilean labor data production
- Sources, Evidence and Solutions
  - Levels
  - Seasonality
  - Economic activity classification
- Conclusions and recommendations

Data Accuracy & Economic Modelling

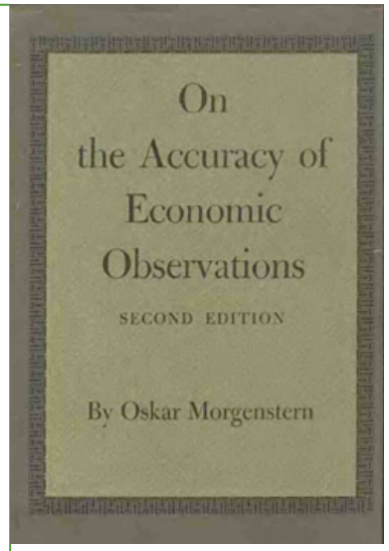
- In all economic modelling we assume data is representative of the subjects of study
- IO base models are no different
- In developing economies data issues could be more recurrent
- This demands an empirical strategy to deal with data inaccuracies.

Data Accuracy & Economic Modelling

Data Accuracy:

- Morgenstern (1965) stated that "***employment statistics frequently offer the opportunity to examine the quality of well prepared economic statistics***"

- However, he also said that "***because of the high political significance of unemployment figures, this area is charged with emotions, insinuations, assertions etc. Depending on the political position of the parties concerned, facts are produced and debated, and the separation of the truth from fabrication is difficult***."



Data Accuracy & Economic Modelling

Data Accuracy: ***"this area is charged with emotions, insinuations, assertions etc. Depending on the political position of the parties concerned, facts are produced and debated, and the separation of the truth from fabrication is difficult."***

- "The government insists in comparing the employment creation with the past government while they are not comparable"

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LA EVOLUCIÓN DEL EMPLEO EN CHILE 1990-2010: UN RECÁLCULO

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EL DÍNAMO

NACIONAL ACTUALIDAD EDUCACIÓN OPINIÓN DEPORTES AMBIENT

NEGOCIOS

Andrea Repetto: "El gobierno insiste en comparar la creación de empleo con los gobiernos anteriores, y no es comparable"

Un cambio metodológico que no se ha difundido le permite al Ejecutivo afirmar que ha creado 700 mil empleos en dos años. Si el cálculo se hiciera con la metodología que se usaba en los gobiernos de la Concertación, las cosas cambiarían... La economista de la Escuela de Gobierno de la Universidad Adolfo Ibáñez, especialista en mercado laboral, aclara la "confusión".

Por **Cindy Rivera** | 5 de abril de 2012

elmostrador

Noticias Mercados TV Cultura País Braga

Blogs y Opinión

lunes, 25 de junio de 2018 | Actualizado a las 19:33

PORTADA PAÍS MUNDO BLOGS Y OPINIÓN SIN EDITAR DEPORTES MULTIMEDIA

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NOTICIAS | BLOGS Y OPINIÓN

Opinión

Cuando la forma se comió al fondo: la meta del millón de empleos

por GONZALO DURÁN Y MARCO KREMERMAN | 11 abril, 2012

Data Accuracy & Economic Modelling

Economic Modelling: Data and LDC

- Hensher and Johnson (1981) said that "***A 'good' model, cannot perform satisfactorily with 'poor' data. Economist, in particular, have been disinclined, until recent years, to generate and record their own data, relying heavily instead on published statistics***"

- Centeno and Siriwardana (2005) state that "***CGE models are criticized on the grounds of data quality to the extent that less developed countries (LDCs) do not generally have reliable data***."

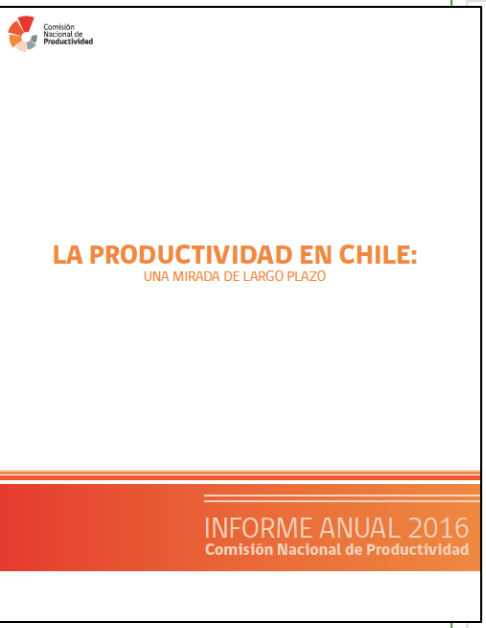
Data accuracy & Economic Modelling

Economic Modelling:

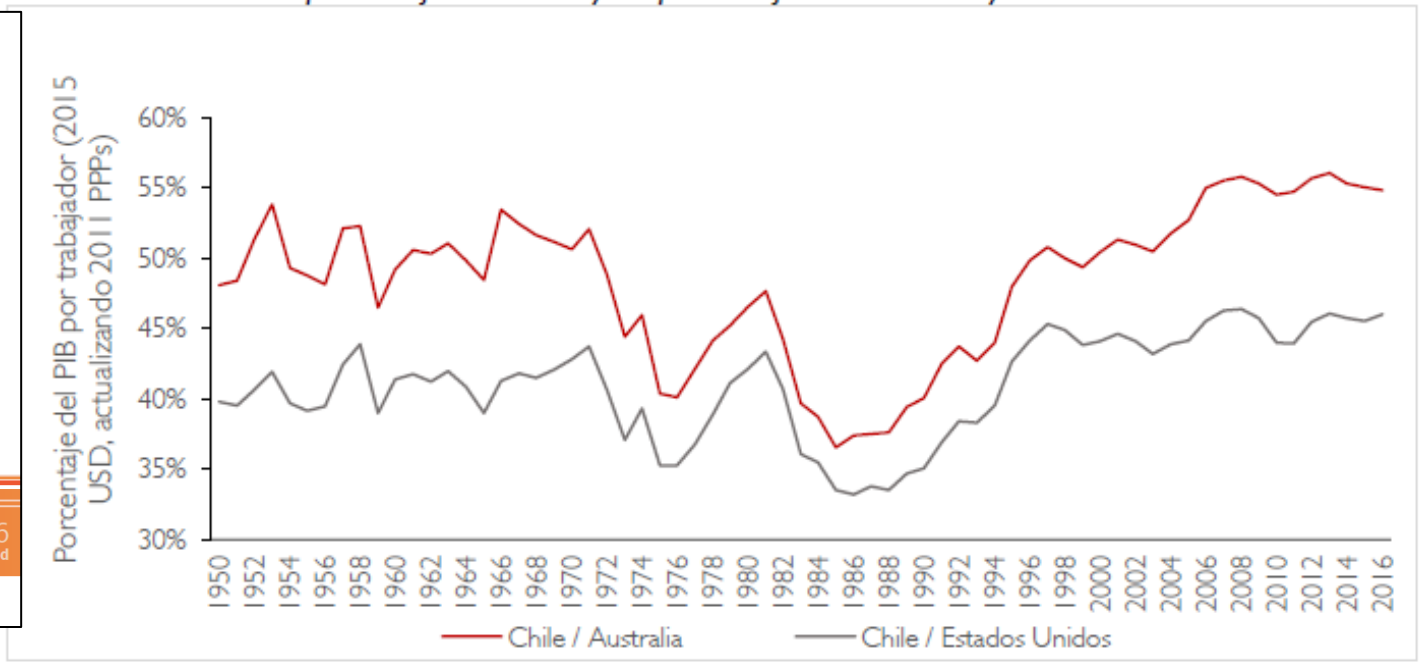
- The Chilean Nacional Commission for Productivity uses OECD data to estimate Gross Domestic Product per Worker and comparing with the same measure for Australia as it is shown in the next graph:

Data accuracy & Economic Modelling

Economic Modelling:



Panel B: Razón entre PIB por Trabajador de Chile y PIB por Trabajador de Australia y Estados Unidos.



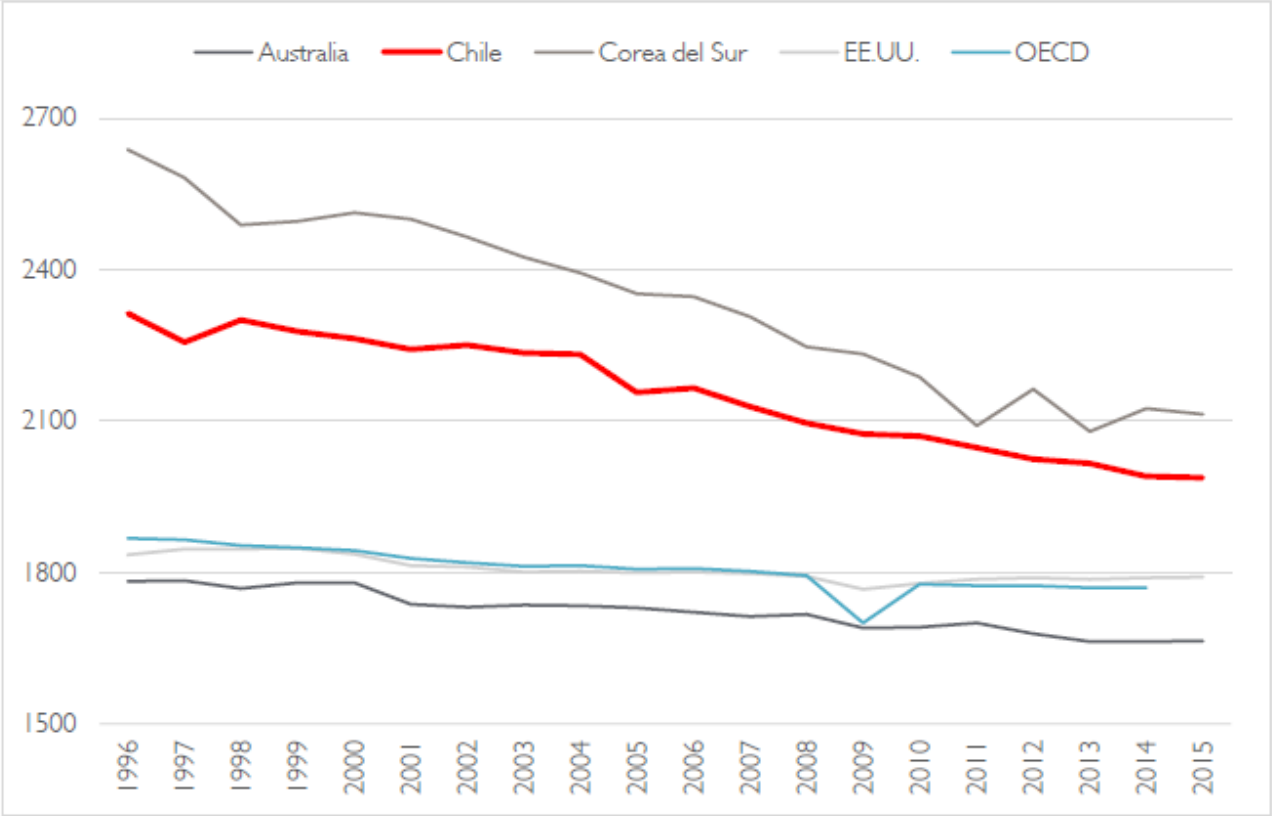
Nota: En el panel superior, los datos son de PIB per cápita PPP de Maddison (Boly y van Zanden) y PWT (por el lado del producto). Los datos de Maddison son hasta 2010, mientras que los de PWT (Feenstra et al, 2015) van desde 1951 hasta 2014. Se usan datos de Maddison hasta 2010, y entre 2011 y 2014 los datos de PWT empalmados con Maddison en 2010. Los datos de PIB real y población, para construir PIB per cápita, son de Penn World Tables 9.0, y cubren desde 1950 (para Chile desde 1951) hasta 2014. En el panel inferior, los datos de productividad laboral por trabajador empleado son de The Conference Board, entre 1950 y 2016, obtenidos desde Maddison y OCDE, usando PPP de PWT (EKS, dólares de 2011, actualizados a 2015) para PIB, y desde Timmer et al (2015) para empleo. Están medidos en dólares estadounidenses de 2015, actualizado por PPP 2011. Se define productividad laboral al cociente entre PIB y trabajadores empleados.

Comisión Nacional de **Productividad**

Data accuracy & Economic Modelling

Economic Modelling: Annual working hours per worker

Figura a. Evolución de horas anuales trabajadas por trabajador - Chile vs países desarrollados



Nota: Los datos representan las horas anuales promedio trabajadas por trabajador, y son obtenidas de la OCDE. Para Australia, Chile, Corea del Sur y Estados Unidos, dado que el interés radica en comparar la evolución de Chile con países desarrollados, se usan datos desde 1996 a 2015, máxima extensión en la que la OCDE tiene datos de esta variable para Chile. Para el promedio de los países OCDE, se usan datos entre 1996 (siguiendo la misma lógica anterior) y 2014 (a falta del dato para 2015).

Data accuracy & Economic Modelling

Economic Modelling: Data and LDC

- Labor productivity and data quality:

OECD said: "Quality comments:

The Chilean Statistics Office <u>(INE) has undertaken no official splicing of employment data after the change of survey in 2010</u>. Therefore, any such splicing in the data has been undertaken by the Secretariat and INE is not responsible for this data."

The Problem: Chilean labor data

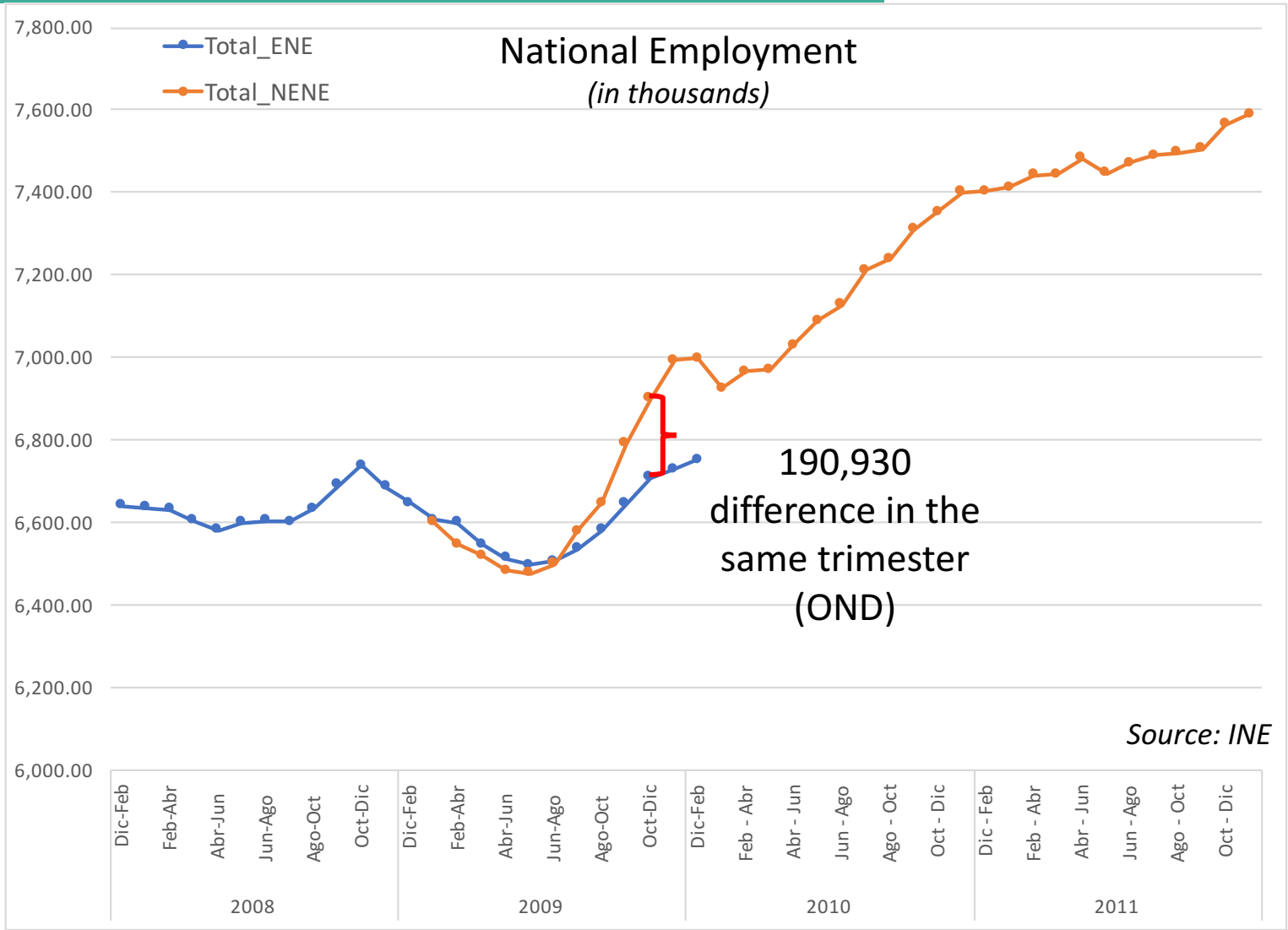
- ENE/NENE context
  - Presentation
  - Changes (2004 / 2009)
    - Reasons
      - 2004: sample design
      - 2009: OECD compatibility → changes in definitions
  - Consequences
    - Jumps in the aggregate and by sector
    - Productivity fall → yields useless IO-based model estimations

Specific Problems

- Problem 1: Levels
- Problem 2: Economic activity classification
- Problem 3: Seasonality
- Problem 4: Sample representation

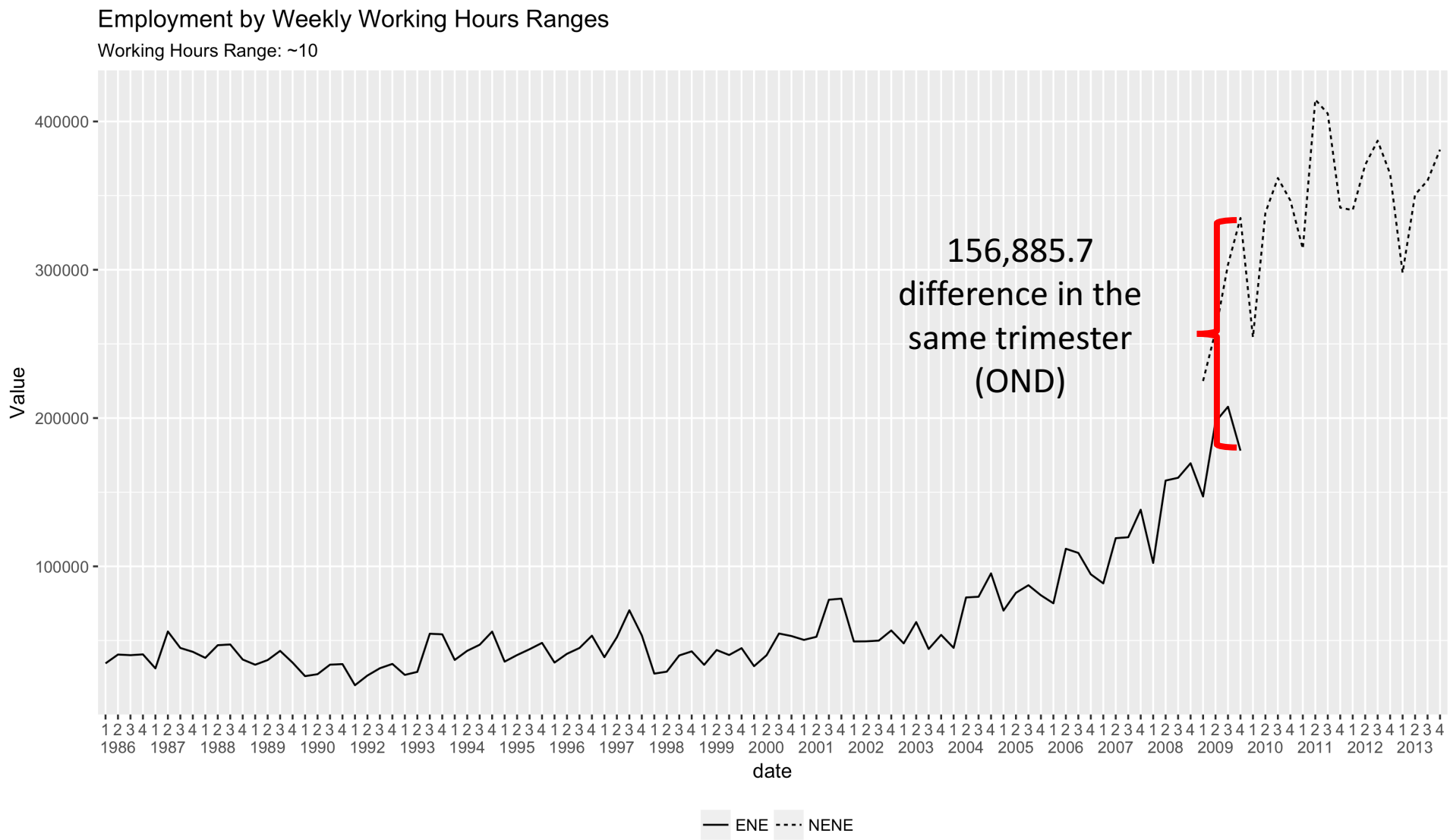
- Dimensions
  - Sources
  - Evidence
  - Solutions

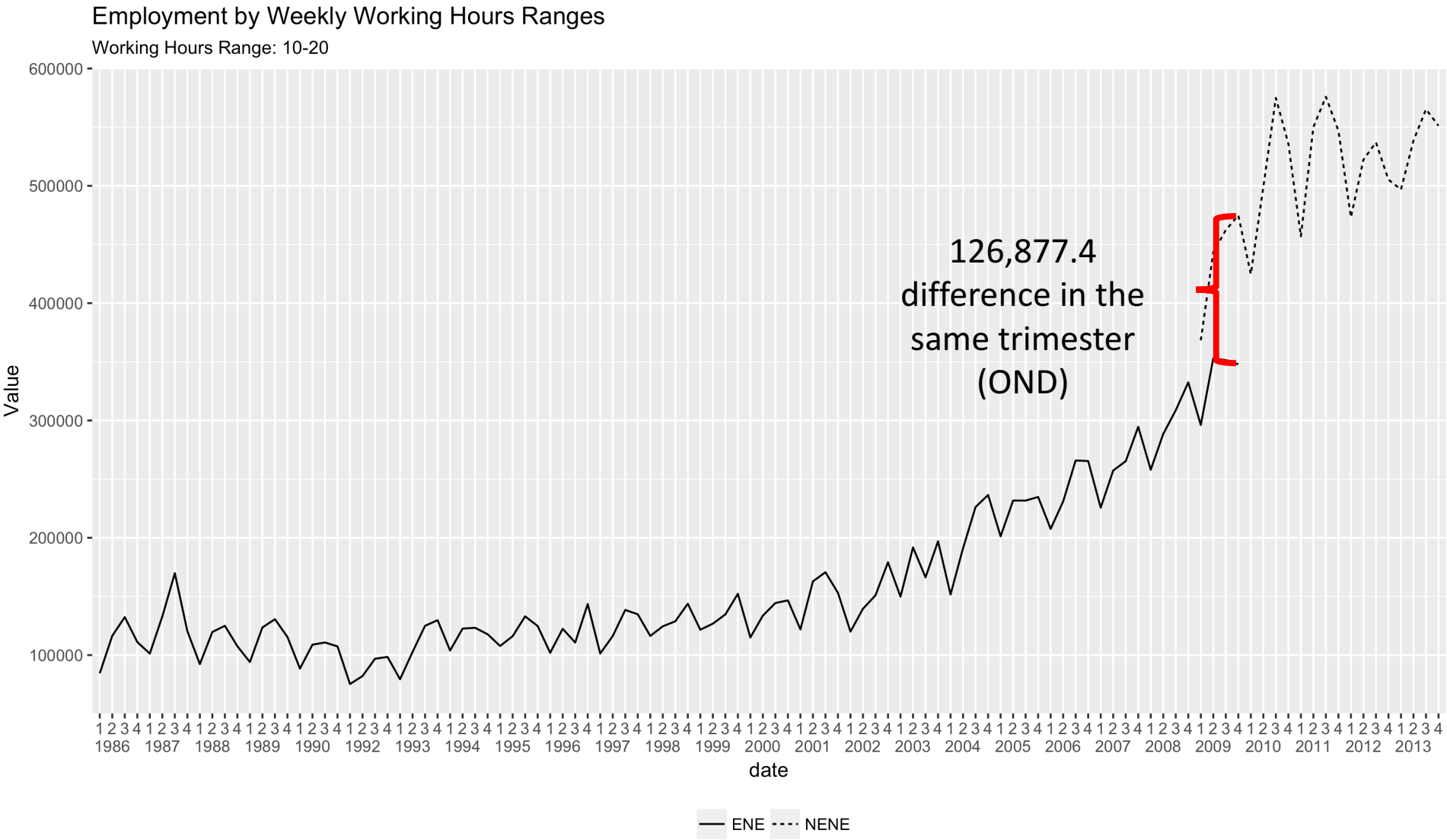
Problem 1: Levels

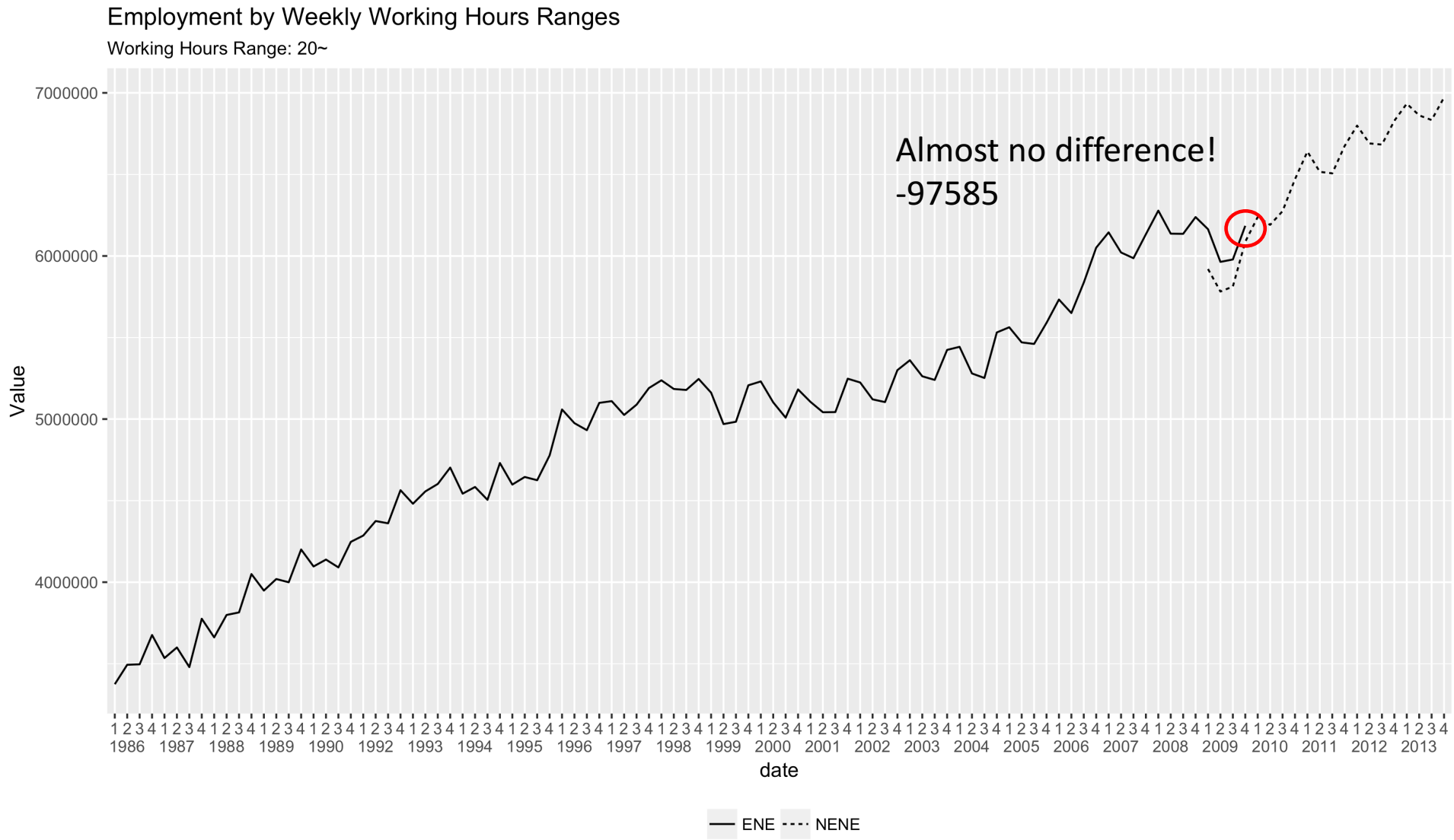


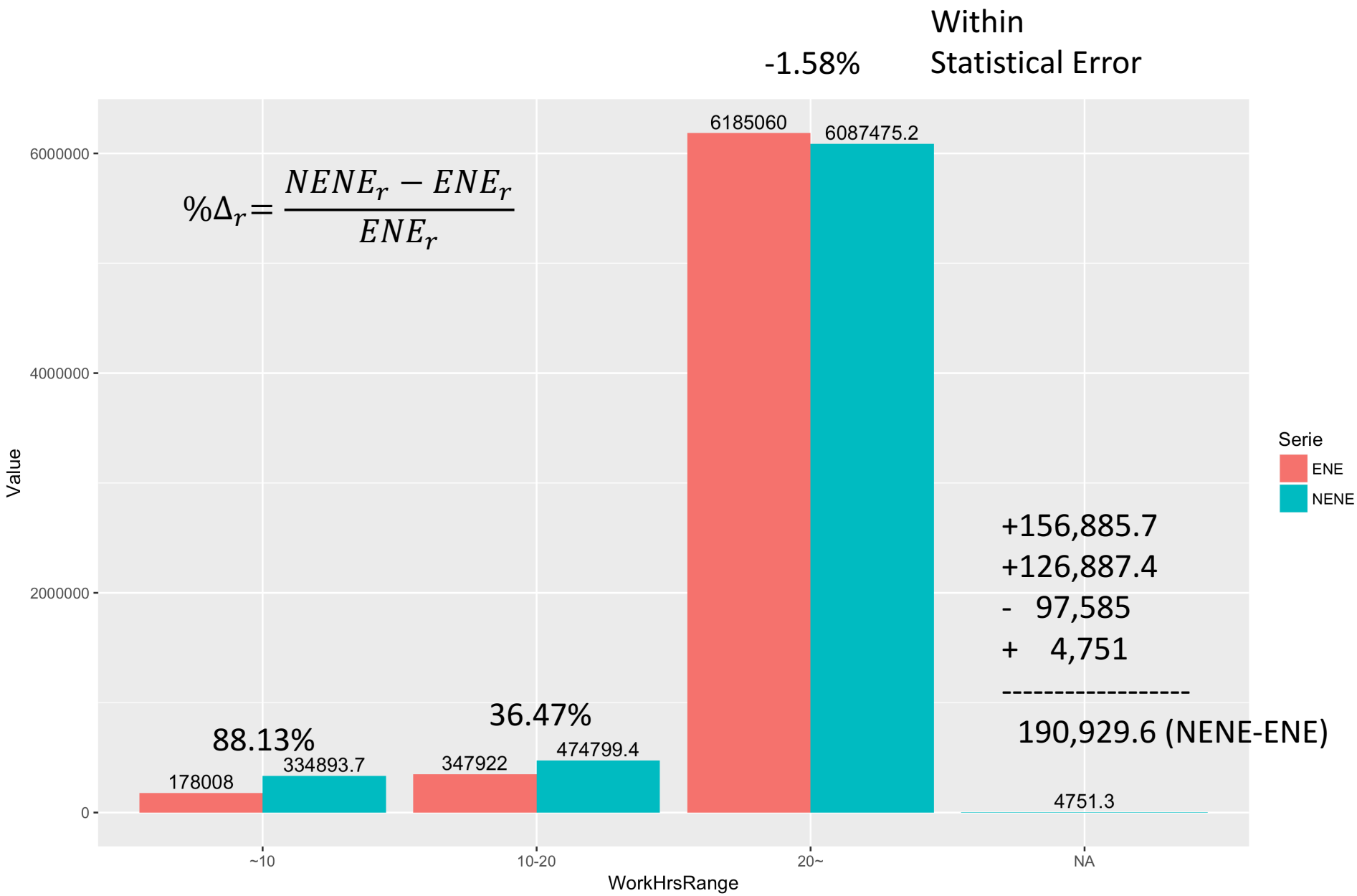
Problem 1: Levels

- Source:
  - Changes in employment definition for OECD compatibility
    - ENE: Employment prior 2009 was was self-reported
    - NENE: Employment after 2010 was detected from responses
- Effects:
  - About 200K respondents than prior to 2009 were not self-considered as employed, now are considered employed by INE
- Evidence
  - Employment by ranges of working hours


Employment by Weekly Working Hours Ranges
Working Hours Range: ~10
Value
400000
300000
200000
100000
156,885.7
difference in the
same trimester
(OND)
1986 1987 1988 1989 1990 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
date
ENE
NENE


Employment by Weekly Working Hours Ranges
Working Hours Range: 10-20
Value
600000
500000
400000
300000
200000
100000
126,877.4
difference in the
same trimester
(OND)
1986 1987 1988 1989 1990 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
date
ENE
NENE


Employment by Weekly Working Hours Ranges
Working Hours Range: 20~
Almost no difference!
-97585
Value
7000000
6000000
5000000
4000000
date
1986
1987
1988
1989
1990
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
ENE
NENE


Within
Statistical Error
-1.58%
$\%\Delta_r = \frac{NENE_r - ENE_r}{ENE_r}$
6185060
6087475.2
88.13%
178008
334893.7
36.47%
347922
474799.4
4751.3
+156,885.7
+126,887.4
- 97,585
+ 4,751

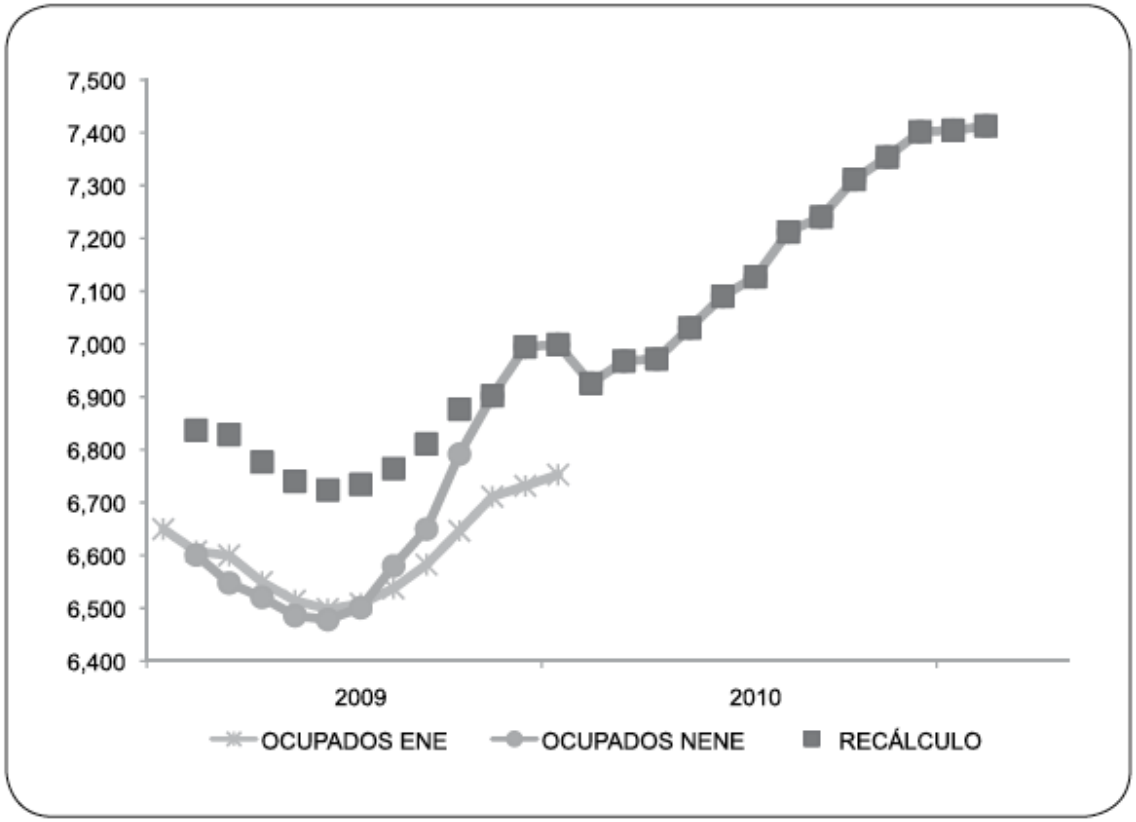
190,929.6 (NENE-ENE)
Serie
ENE
NENE
Value
6000000
4000000
2000000
0
~10
10-20
20~
NA
WorkHrsRange

Problem 1: Levels

- Solutions:
  - Bring the past to the present levels
    - Adjust ENE data (prior) 2009 to the levels of the NENE data (post-2009)
  - Option 1: Landerreche (2011)
    - Step 1: Calculate the 2009 general ratio (NENE/ENE) from the overlapping period
    - Step 2: Adjust the data prior 2009 using this ratio
    - Step 3: Repeat by sectors
  - Option 2: Working Hours Ranges
    - Step 1: Calculate the 2009 ratio (NENE/ENE) by Working Hours Ranges
    - Step 2: Adjust the data prior 2009 using this ratio
    - Step 3: Repeat by Sectors

Problem 1: Levels – Opt 1: General ratio

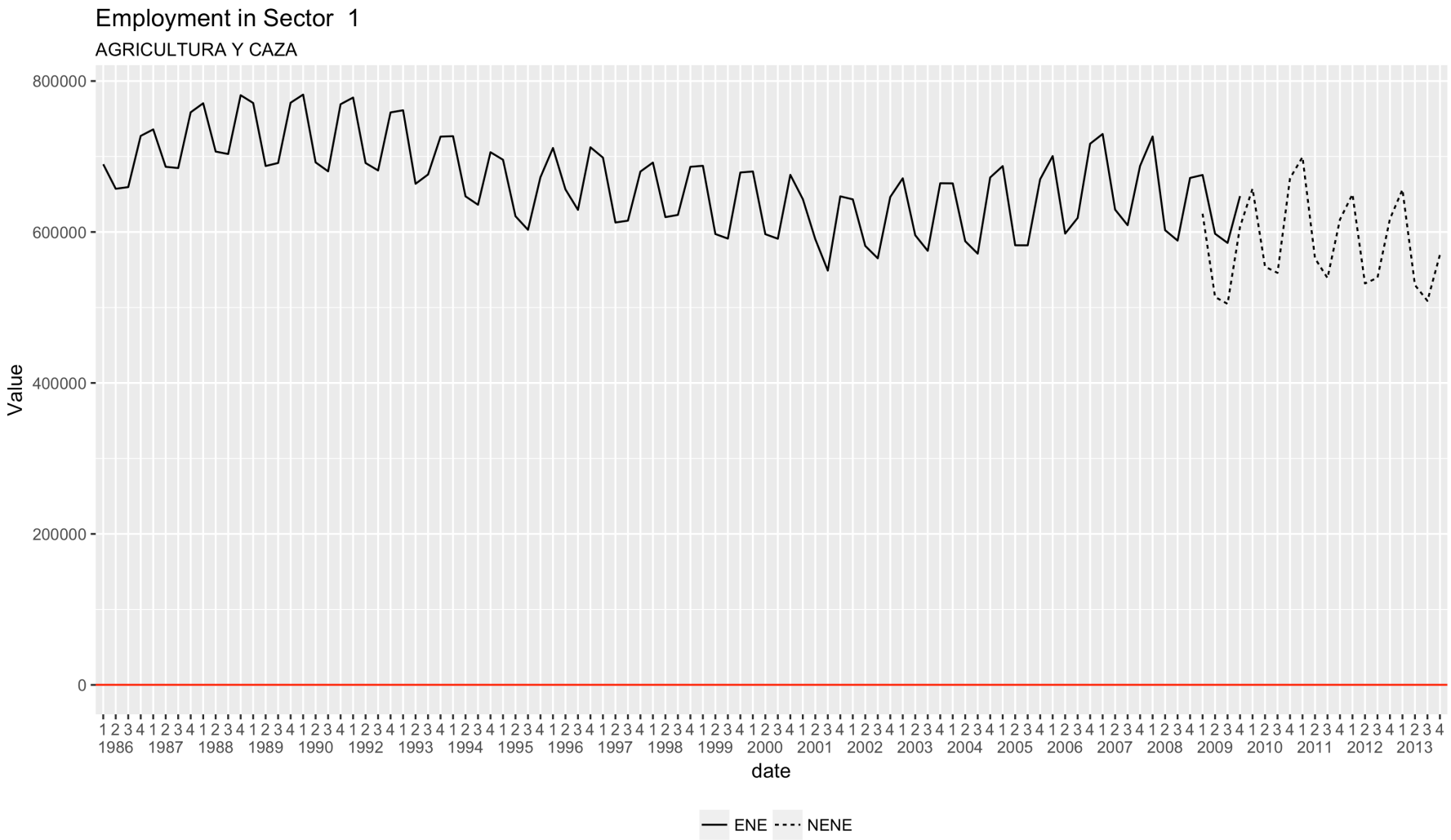
Gráfico 5
Recálculo del periodo inicial NENE y comparación con la NENE original y con la ENE
miles de personas empleadas



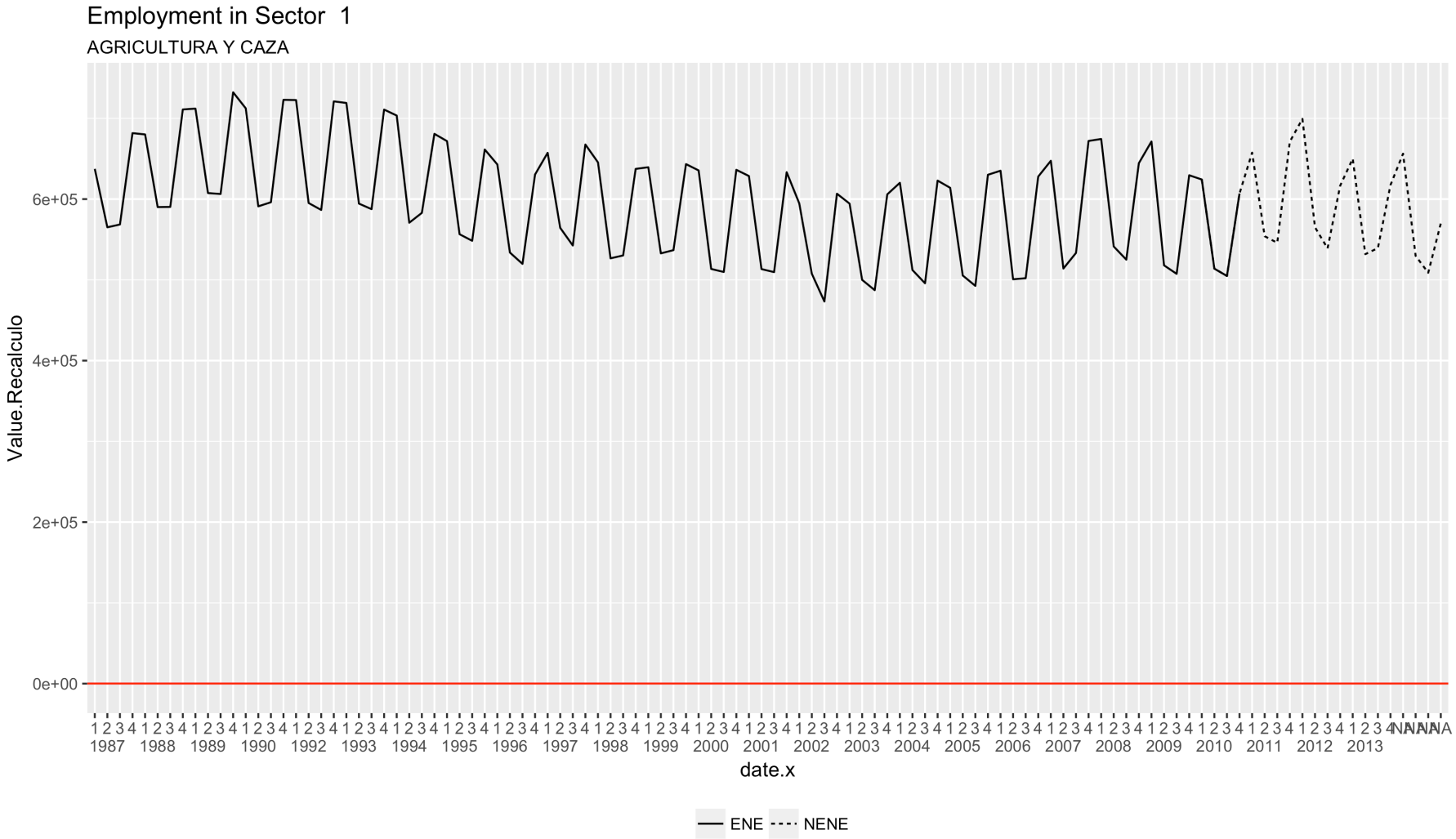
Fuente: INE

Landerreche (2011)

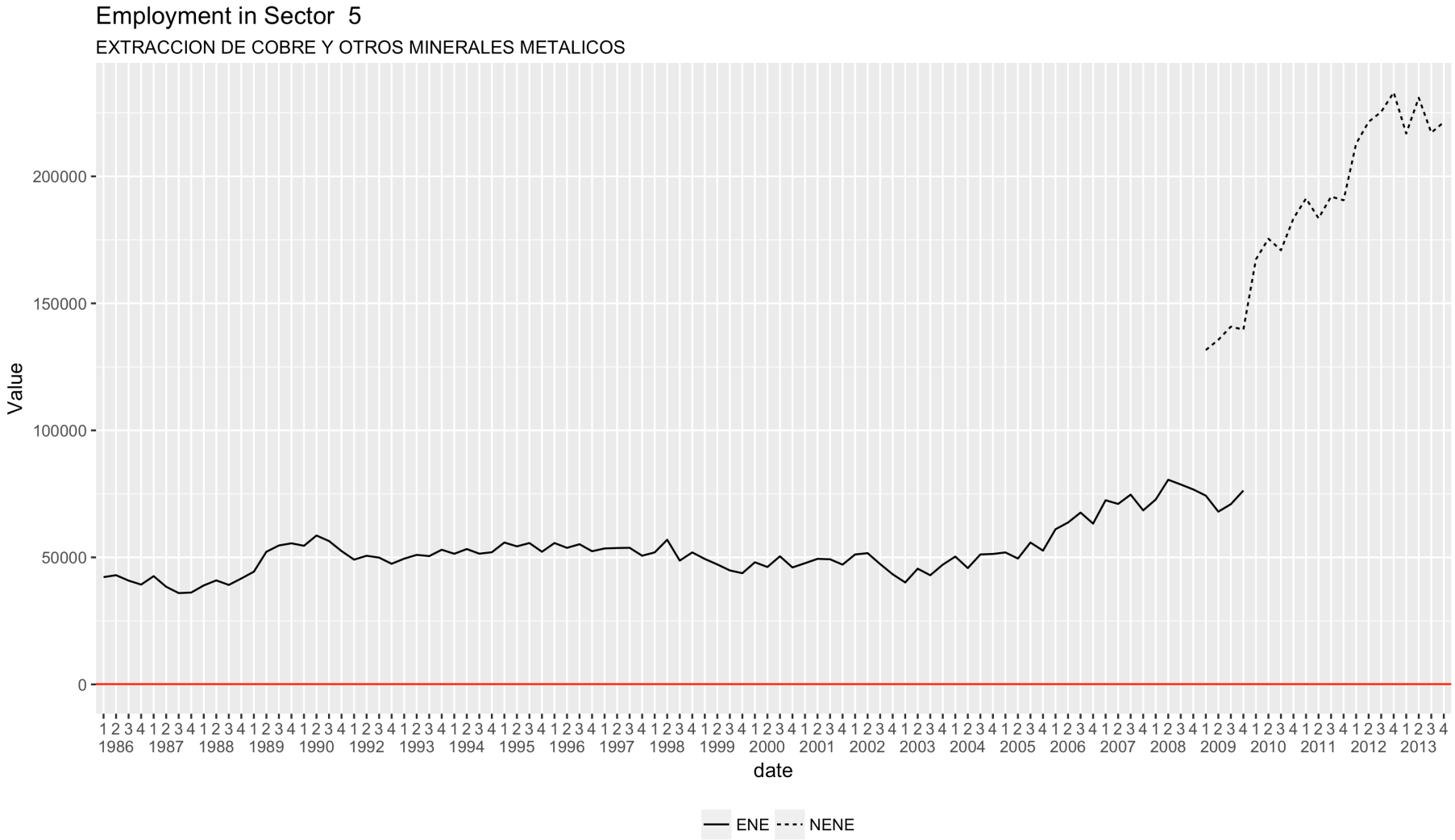
Problem 1: Levels – Opt 1: General ratio



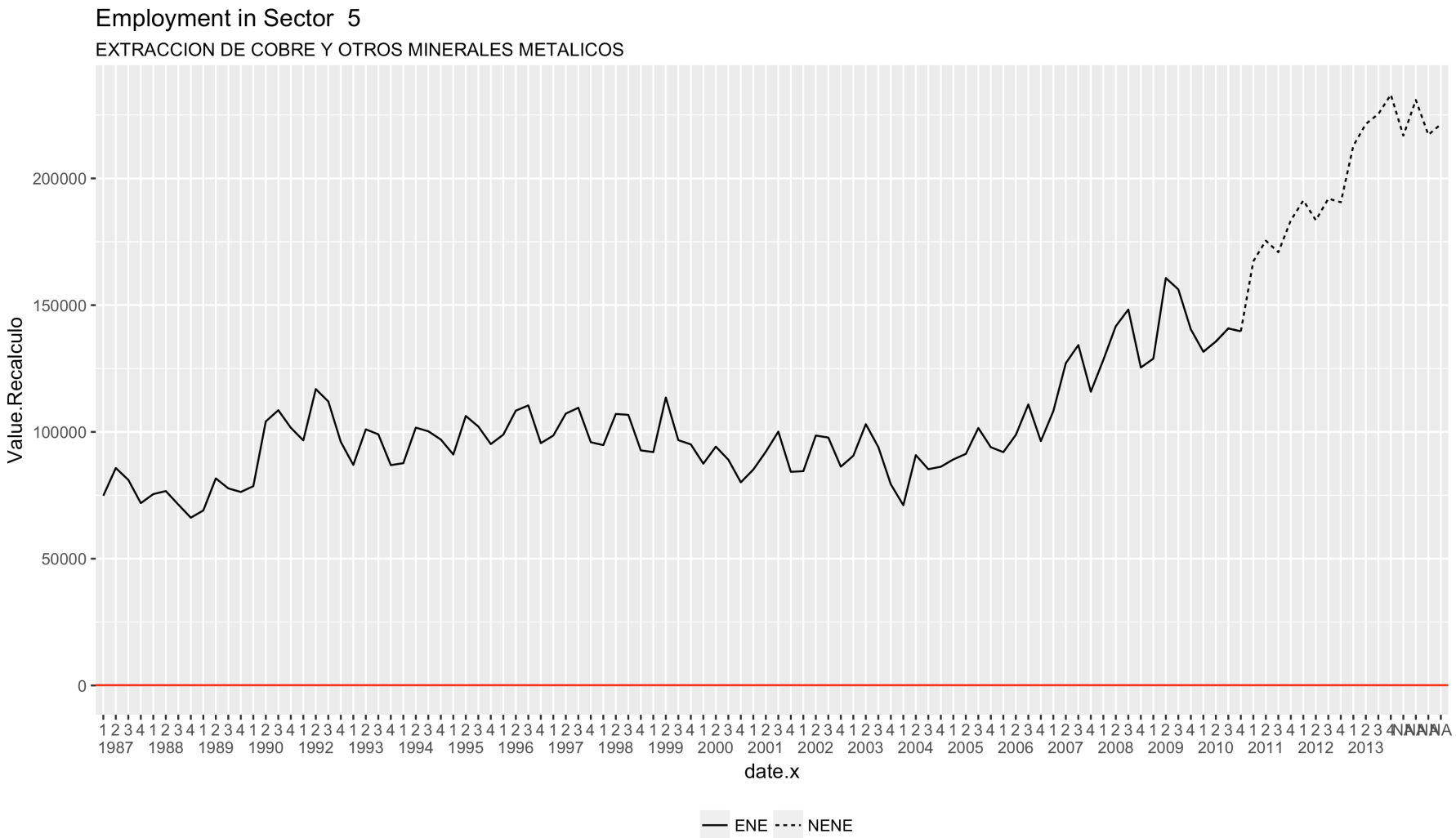
Problem 1: Levels – Opt 1: General ratio



Problem 1: Levels – Opt 1: General ratio



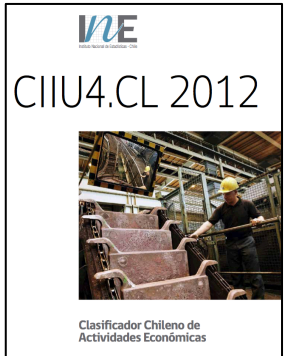
Problem 1: Levels – Opt 1: General ratio



Problem 2: Economic Activity Classification

- Sources:
  - Long-span Data (1986-2013) – 108 periods
  - Changes in International Standard Industrial Classification (ISIC)
  - INE Chile adapts ISIC to the Chilean Context

Period	ISIC	CIIU.cl	ENE	NENE
1969 ~ 1989	Rev. 2	Rev. 2 – (1970)	Rev. 2	
1989 ~ 2002	Rev. 3	Rev. 2	Rev. 2, 3	
2002 ~ 2008	Rev. 3.1	Rev. 3.1 – (2003)	Rev. 2, 3.1	
2008 ~ 2012	Rev. 4	Rev. 3.1	Rev. 2, 3.1	Rev. 2, 3.1, 4
2012 ~	Rev. 4	Rev. 4 – (2003)		Rev. 4

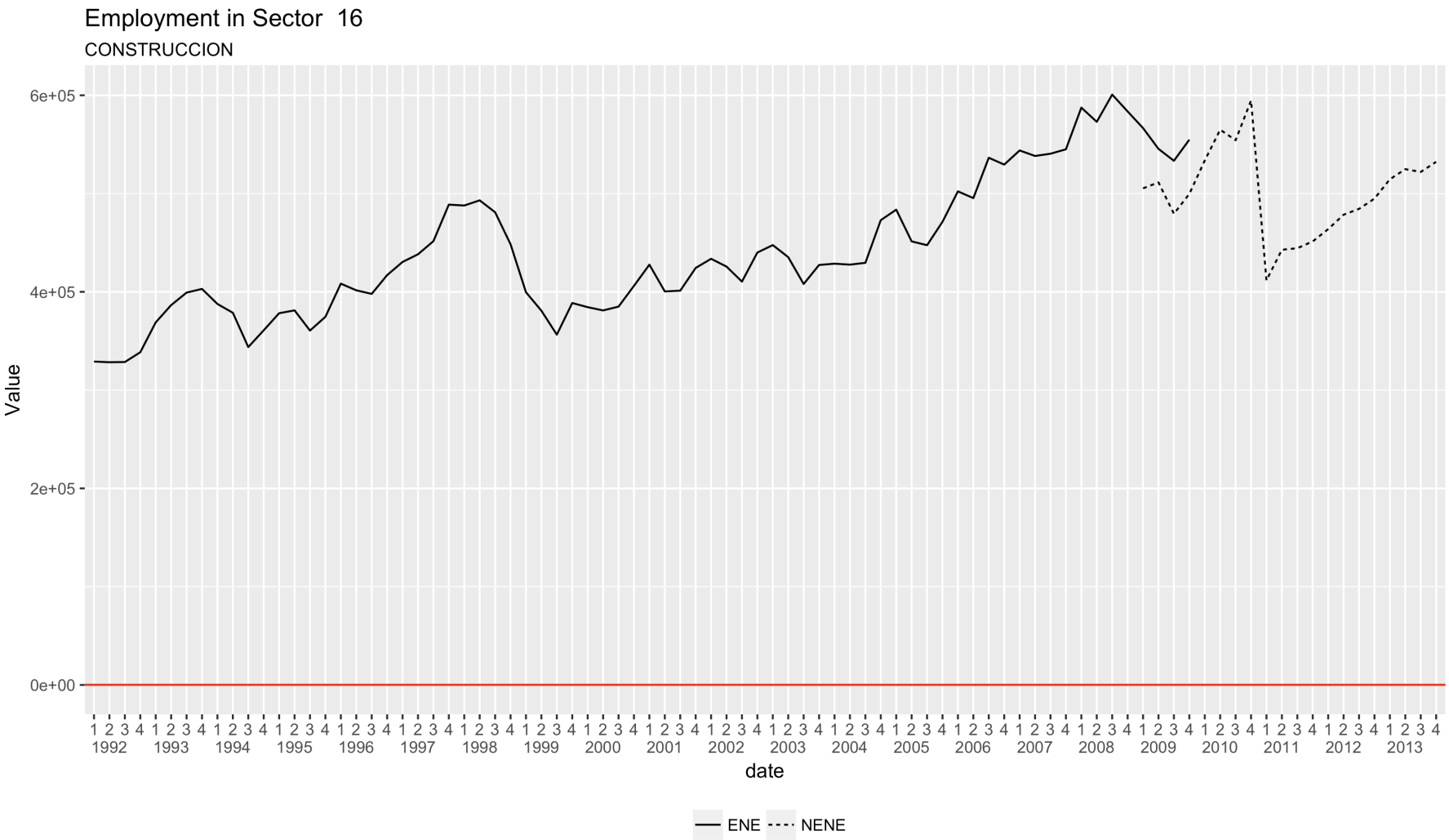


Problem 2: Economic Activity Classification

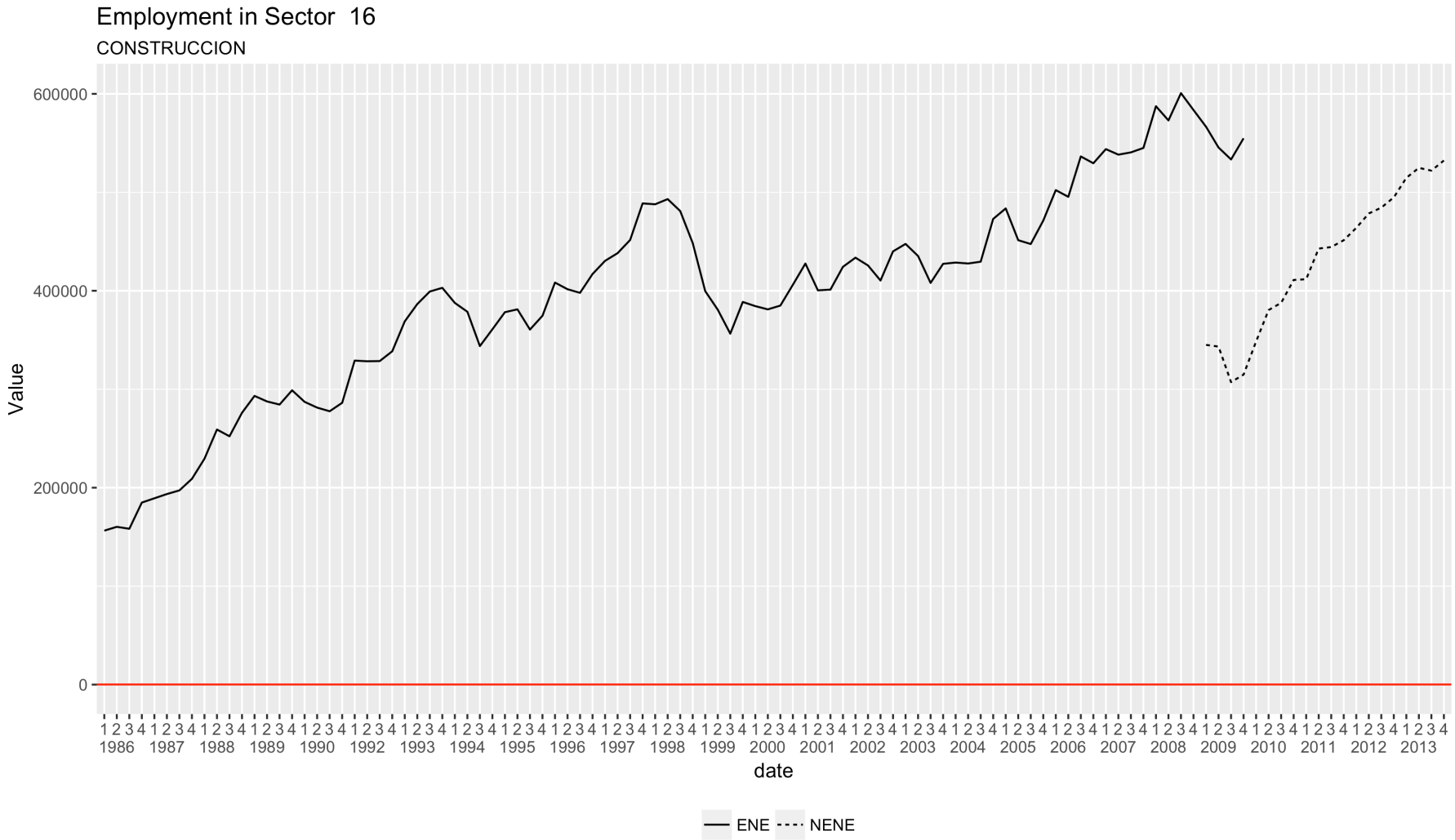
- Solution:
  - Recodify labor data to a single standard (CIIU 4 Rev. 4)
  - Reassign workers to sectors accordingly
  - Recalculate series by sectors

CIIU4Rev4_Desc	CIIU Rev4	CIIU Rev2	CIIURev2_ Desc	Wrong	Survey Original Response
Construcción de proyectos de servicio público	4220	51	CONSTRUCCION DE EDIFICIOS COMPLETOS O PARTES DE EDIFICIOS	1	MANTENCION DE CAÑERIAS CONDUCTORAS DE AGUA POTABLE EN LA VIA PUBLICA
Construcción de proyectos de servicio público	4220	52	CONSTRUCCION DE OBRAS		MANTENCION DE CAÑERIAS CONDUCTORAS DE AGUA POTABLE EN LA VIA PUBLICA

Problem 2: Economic Activity Classification



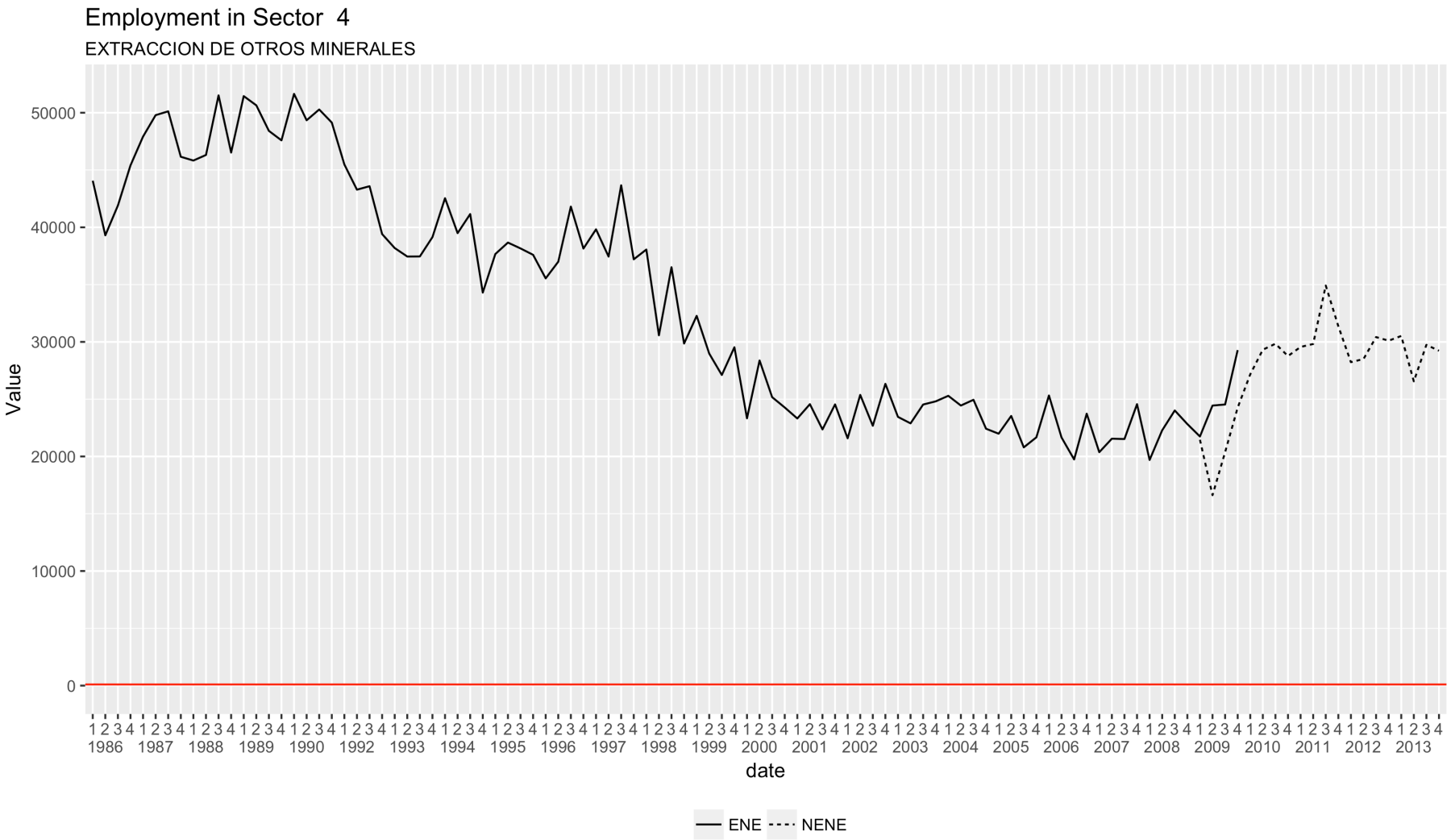
Problem 2: Economic Activity Classification



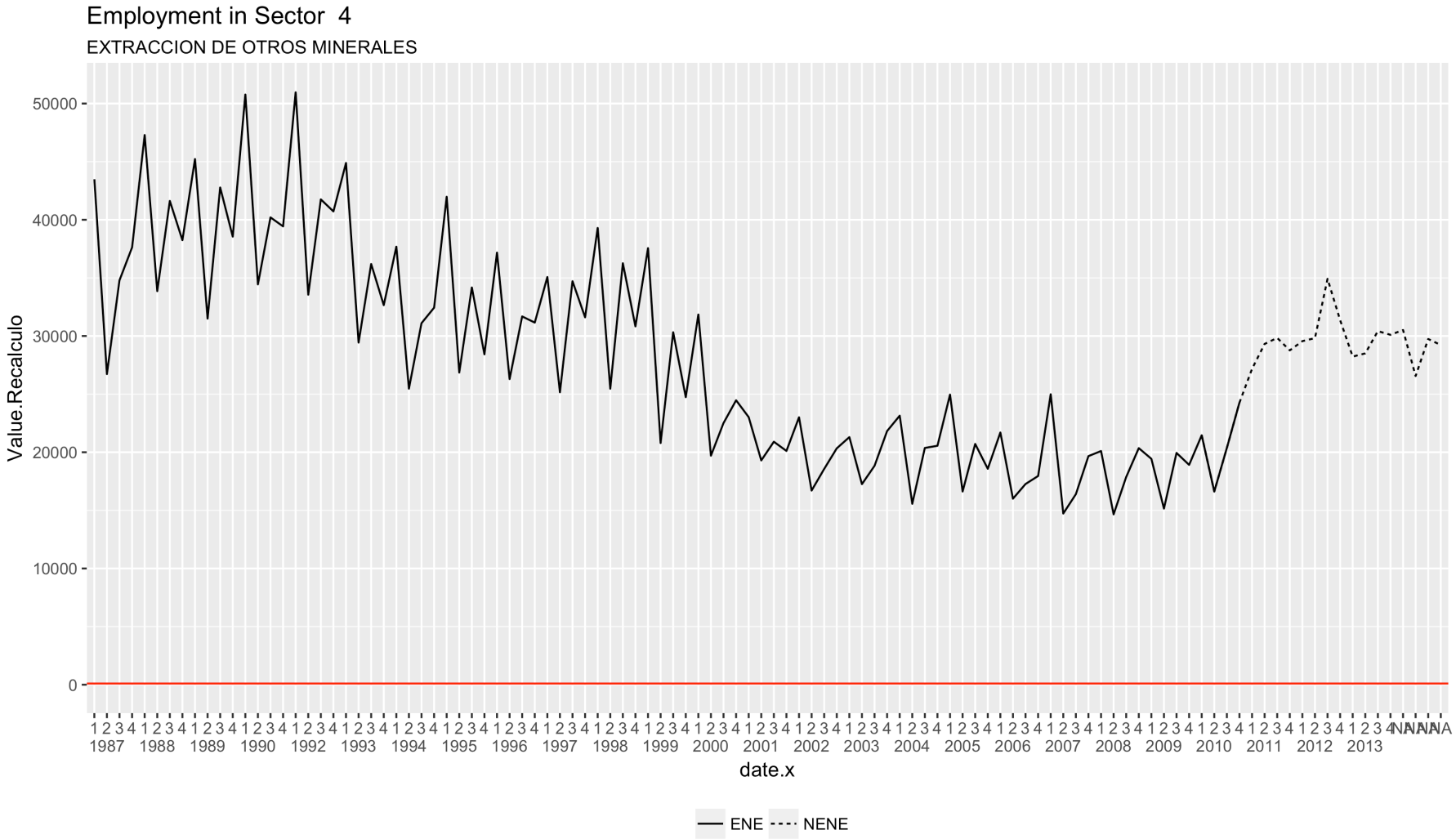
Problem 3: Seasonality

- Sources:
  - Potential sample selection bias
  - Budget cuts to perform both surveys (ENE-NENE) at the same time

Problem 3: Seasonality – Opt 1: General ratio

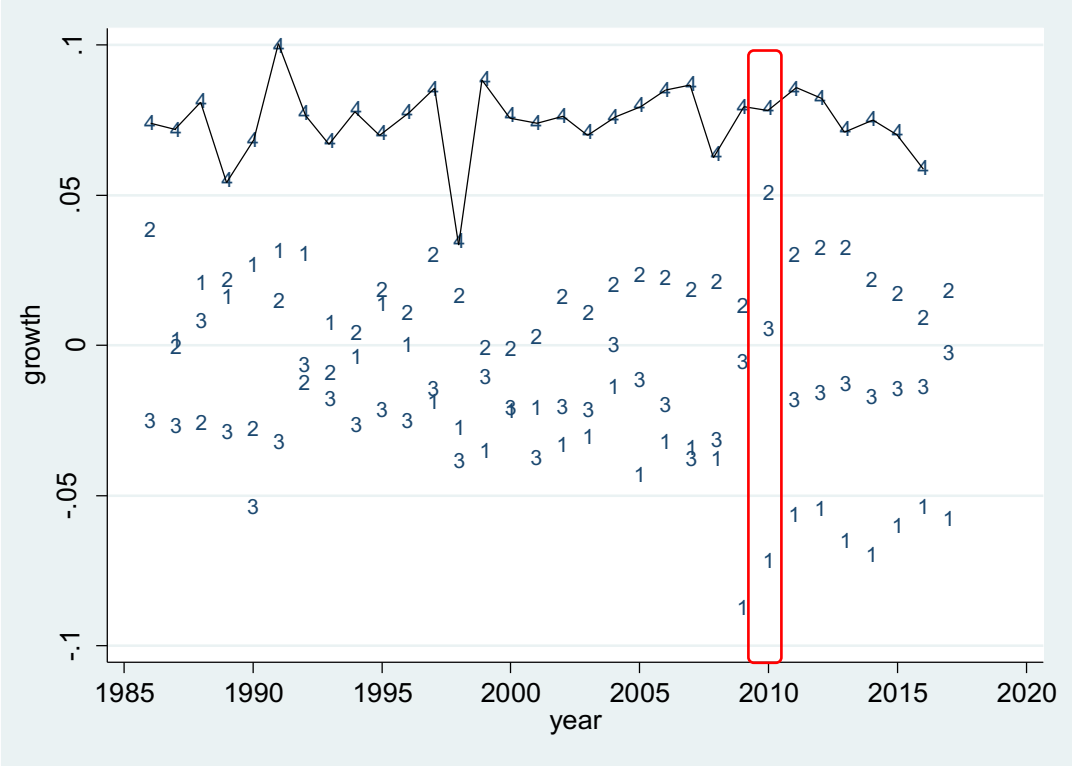


Problem 3: Seasonality – Opt 1: General ratio

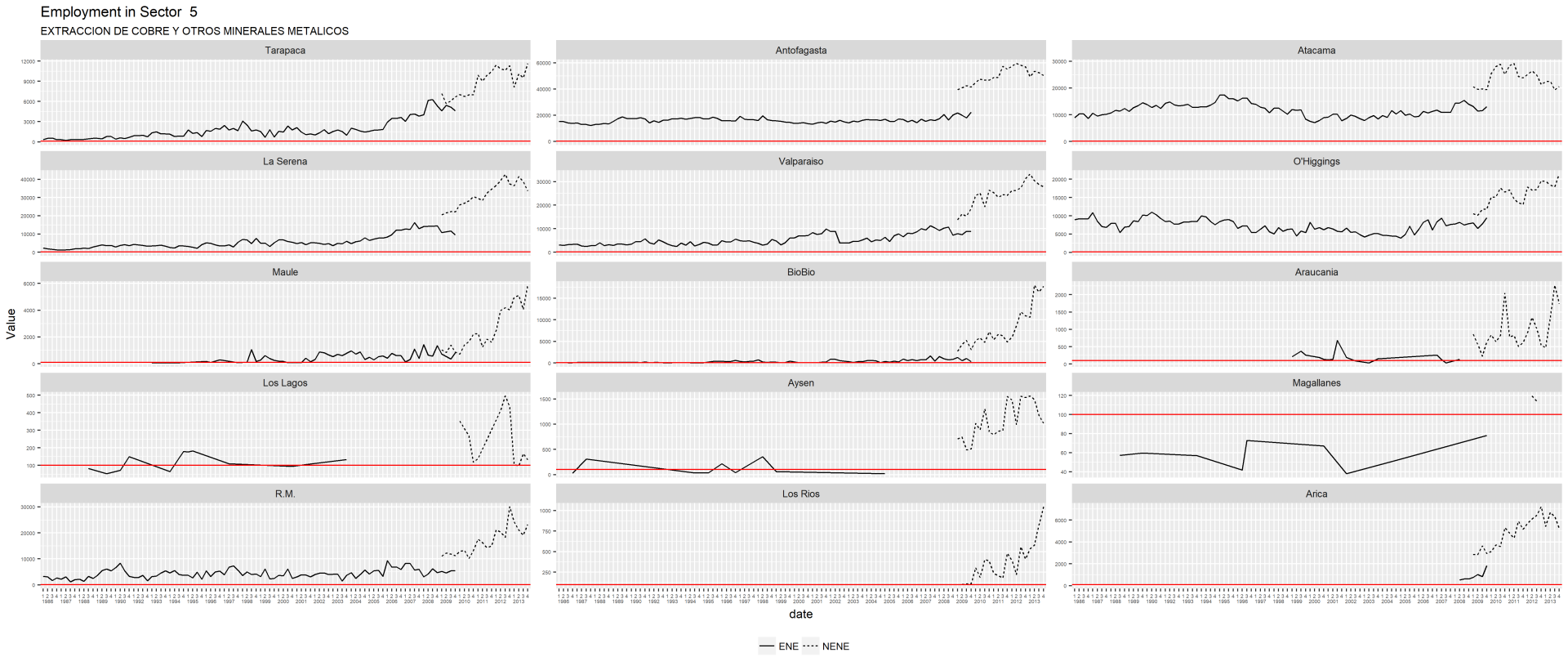


Problem 3: Seasonality

- Solution:
  - Use GDP series seasonality
  - Basic idea:
    - Any increase in labor should have also yield in a GDP increase



Problem 4: Sample Representation



Problem 4: Sample Representation

- Sources:
  - Survey provides an expansion factor variable calculated for the nation
- Solution
  - Use census data to calculate expansion factors that are representative at the regional and sector levels

Conclusions

- Option 1 has been done
  - Chile data yields more stable statistics
  - Ok to use with IO-based models
- Issues to continue solving
  - Go for option 2 (based on working hrs) and compare
    - Should not yield significant differences
    - However we win in economic intuition and explanation
  - Run GDP-based forecast to adjust seasonality
  - Calculate Census-based expansion factors

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