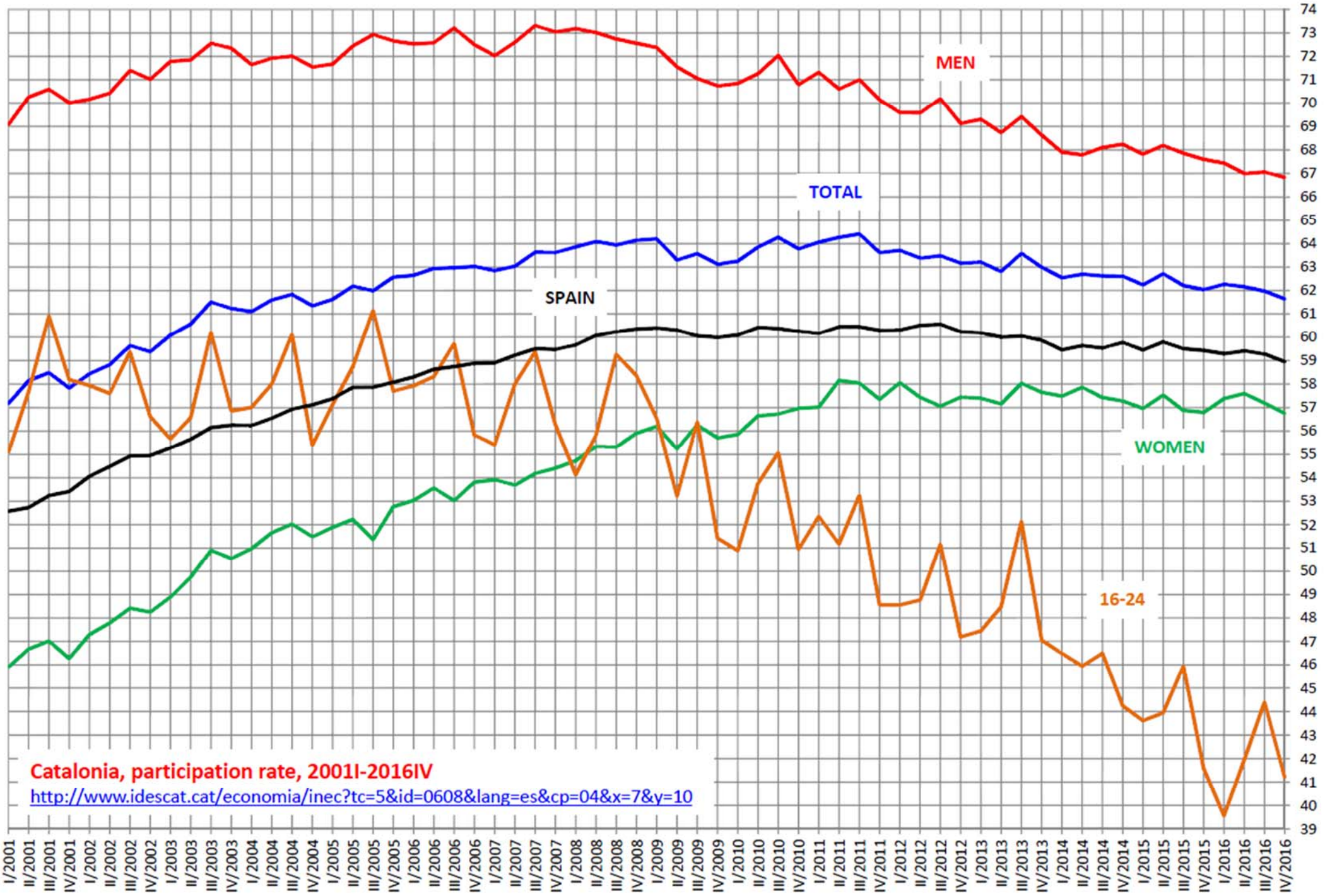
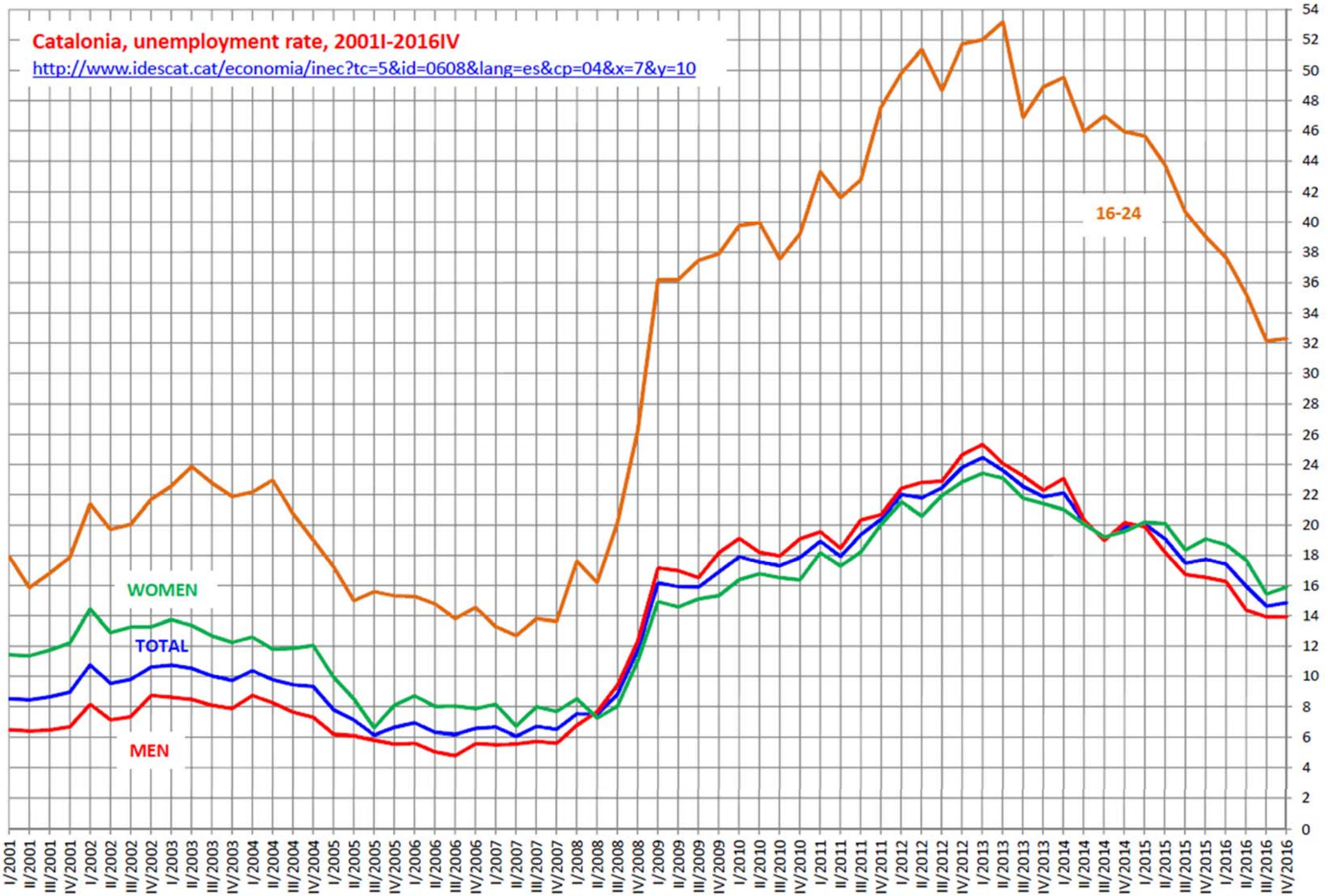
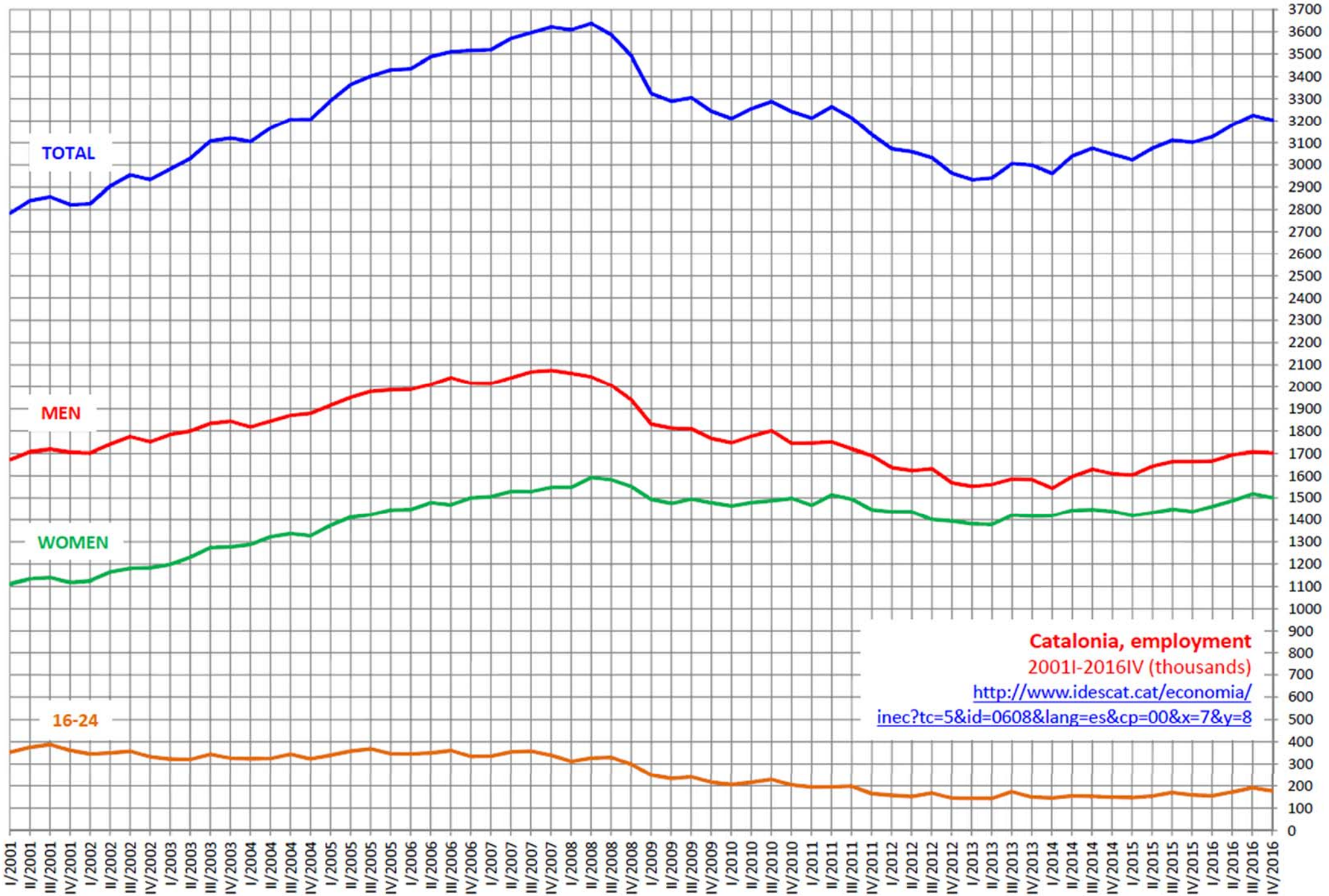
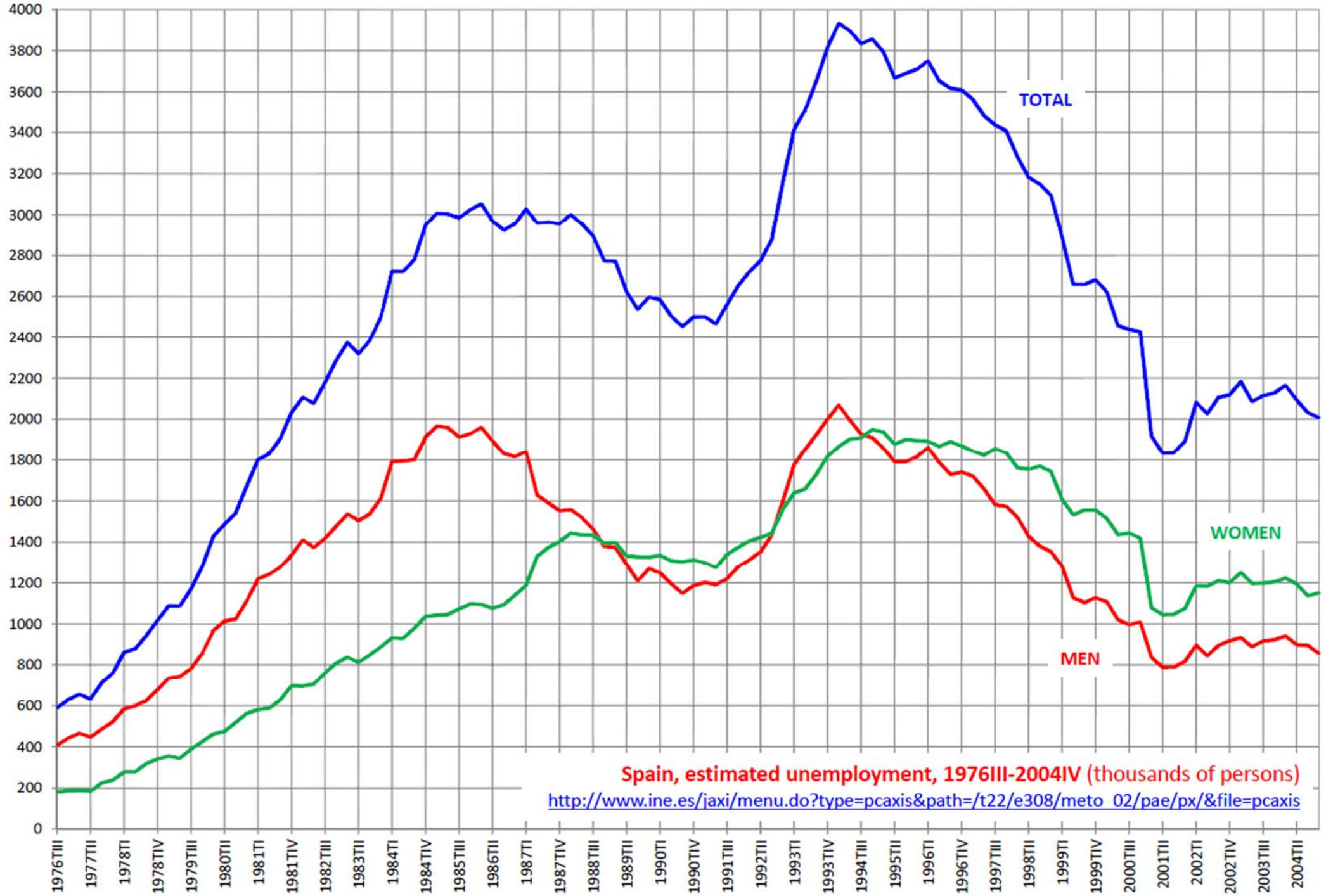
Unemployment rate

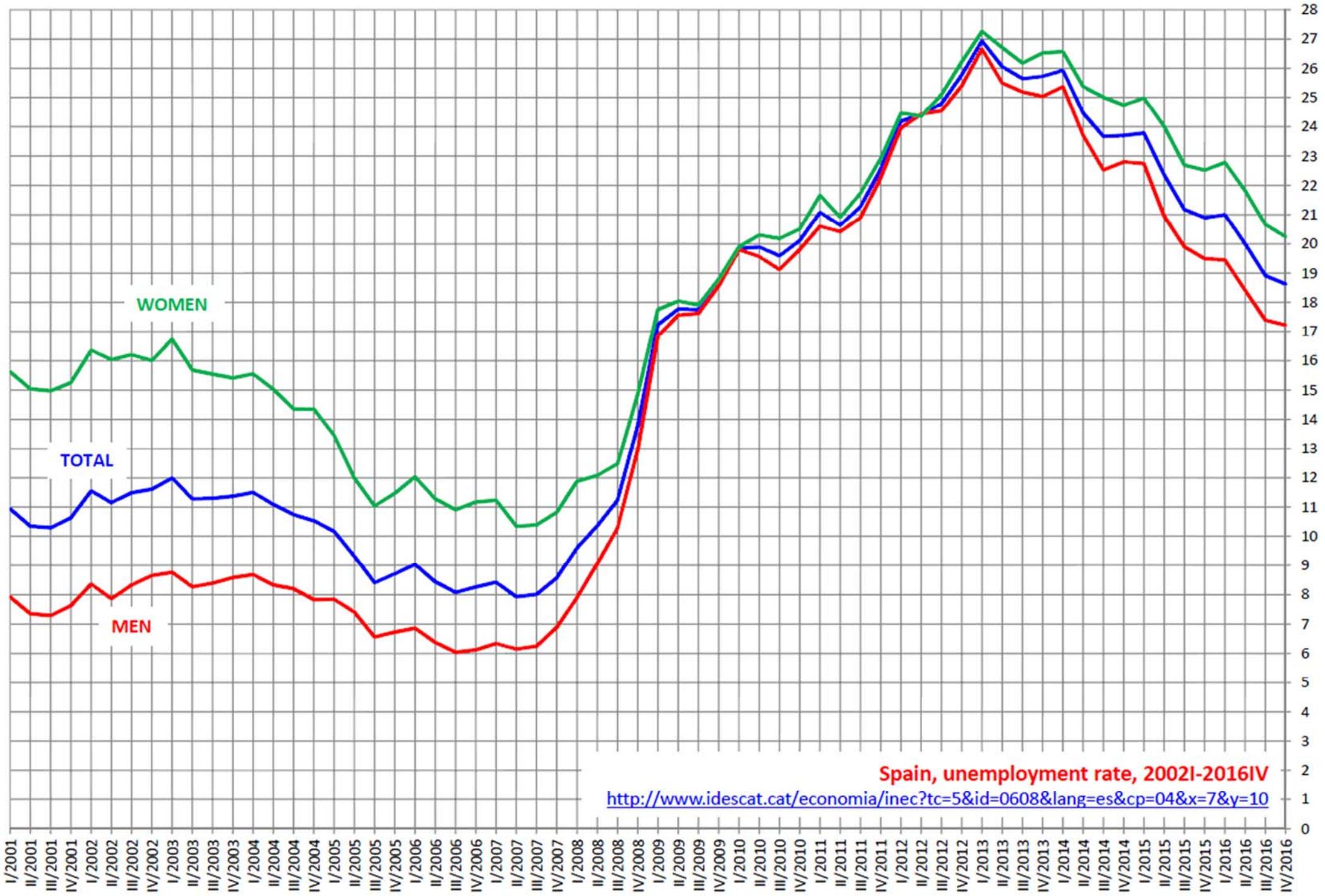
- Important rates in an economy: interest rate, exchange rate, inflation rate, and unemployment rate.
- Employment = number of people having a job.
- Unemployment = number of people not having a job but looking for one.
- Labour force = Employment + Unemployment
- $\text{Unemployment rate} = \dfrac{\text{Unemployment}}{\text{Labour force}}$
- $\text{Participation rate} = \dfrac{\text{Labour force}}{\text{Economically active population}}$

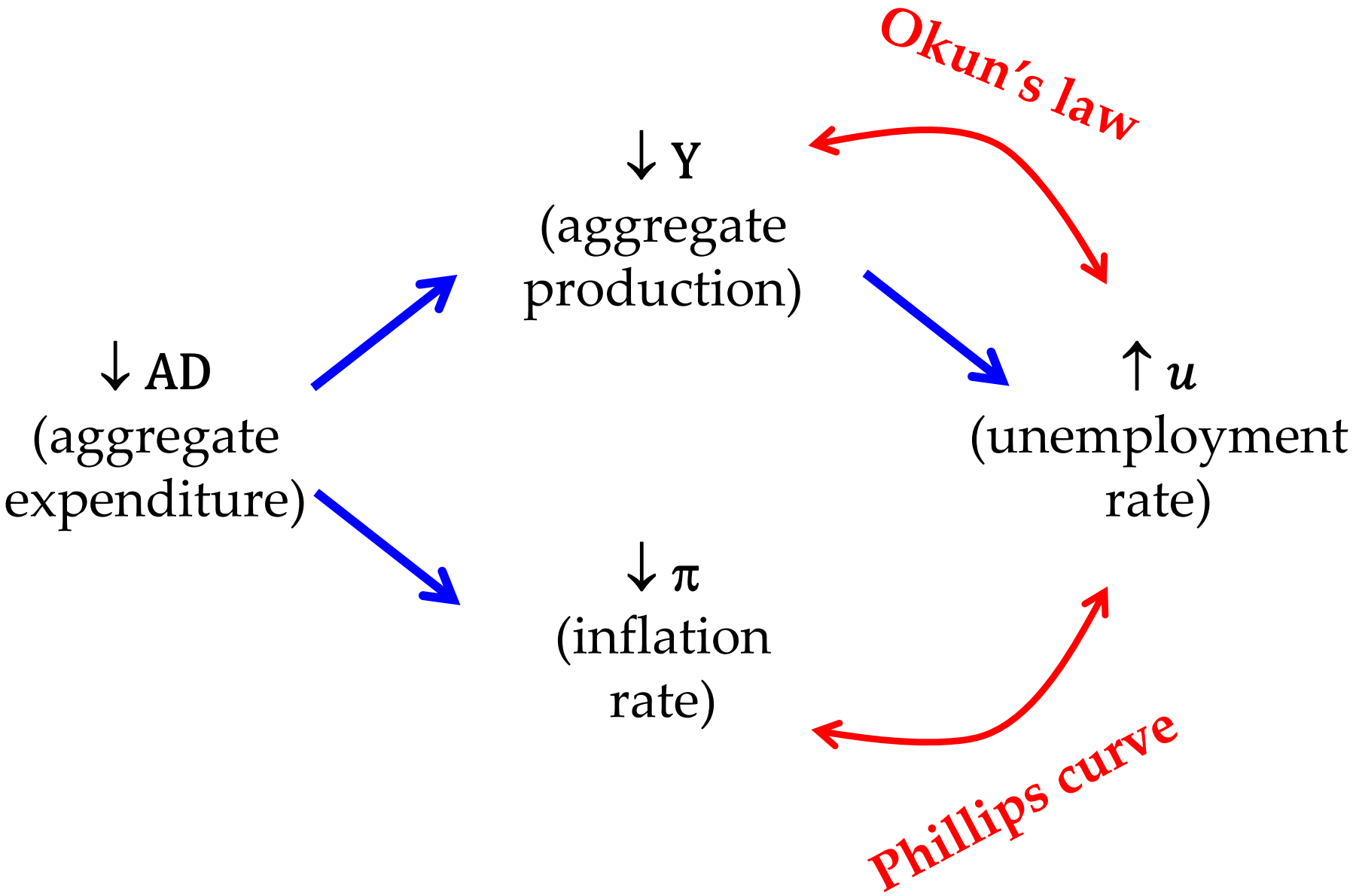

MEN
TOTAL
SPAIN
WOMEN
16-24
Catalonia, participation rate, 2001I-2016IV
http://www.idescat.cat/economia/inec?tc=5&id=0608&lang=es&cp=04&x=7&y=10

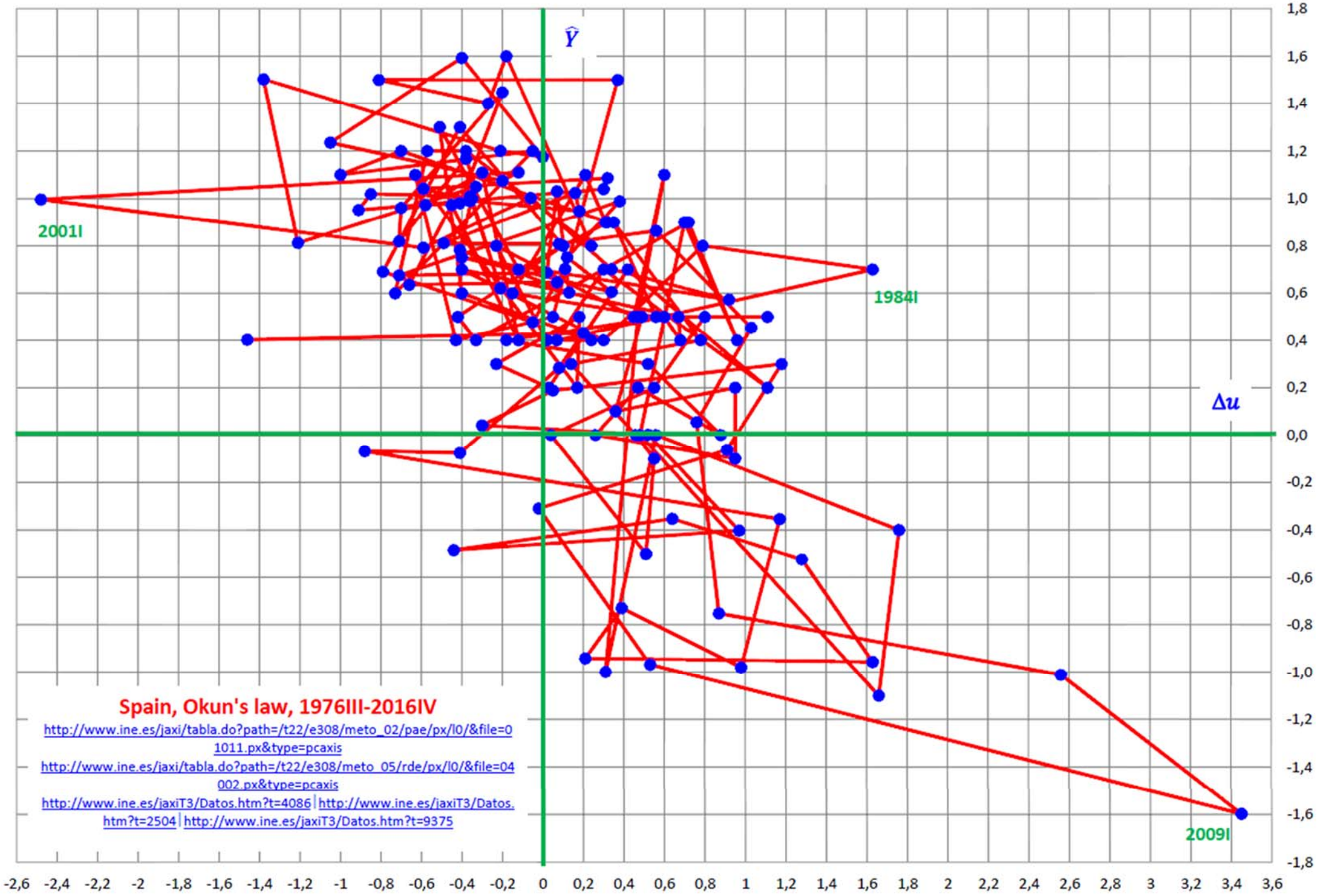

Catalonia, unemployment rate, 2001I-2016IV
http://www.idescat.cat/economia/inec?tc=5&id=0608&lang=es&cp=04&x=7&y=10
16-24
WOMEN
TOTAL
MEN
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
I/2001
II/2001
III/2001
IV/2001
I/2002
II/2002
III/2002
IV/2002
I/2003
II/2003
III/2003
IV/2003
I/2004
II/2004
III/2004
IV/2004
I/2005
II/2005
III/2005
IV/2005
I/2006
II/2006
III/2006
IV/2006
I/2007
II/2007
III/2007
IV/2007
I/2008
II/2008
III/2008
IV/2008
I/2009
II/2009
III/2009
IV/2009
I/2010
II/2010
III/2010
IV/2010
I/2011
II/2011
III/2011
IV/2011
I/2012
II/2012
III/2012
IV/2012
I/2013
II/2013
III/2013
IV/2013
I/2014
II/2014
III/2014
IV/2014
I/2015
II/2015
III/2015
IV/2015
I/2016
II/2016
III/2016
IV/2016


TOTAL
MEN
WOMEN
16-24
Catalonia, employment
2001I-2016IV (thousands)
http://www.idescat.cat/economia/inec?tc=5&id=0608&lang=es&cp=00&x=7&y=8
3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
I/2001
II/2001
III/2001
IV/2001
I/2002
II/2002
III/2002
IV/2002
I/2003
II/2003
III/2003
IV/2003
I/2004
II/2004
III/2004
IV/2004
I/2005
II/2005
III/2005
IV/2005
I/2006
II/2006
III/2006
IV/2006
I/2007
II/2007
III/2007
IV/2007
I/2008
II/2008
III/2008
IV/2008
I/2009
II/2009
III/2009
IV/2009
I/2010
II/2010
III/2010
IV/2010
I/2011
II/2011
III/2011
IV/2011
I/2012
II/2012
III/2012
IV/2012
I/2013
II/2013
III/2013
IV/2013
I/2014
II/2014
III/2014
IV/2014
I/2015
II/2015
III/2015
IV/2015
I/2016
II/2016
III/2016
IV/2016


TOTAL
WOMEN
MEN
Spain, estimated unemployment, 1976III-2004IV (thousands of persons)
http://www.ine.es/jaxi/menu.do?type=pcaxis&path=/t22/e308/meto_02/pae/px/&file=pcaxis
4000
3800
3600
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1976TIII
1977TII
1978TI
1978TIV
1979TIII
1980TII
1981TI
1981TIV
1982TIII
1983TII
1984TI
1984TIV
1985TIII
1986TII
1987TI
1987TIV
1988TIII
1989TII
1990TI
1990TIV
1991TIII
1992TII
1993TI
1993TIV
1994TIII
1995TII
1996TI
1996TIV
1997TIII
1998TII
1999TI
1999TIV
2000TIII
2001TII
2002TI
2002TIV
2003TIII
2004TII


WOMEN
TOTAL
MEN
Spain, unemployment rate, 2002I-2016IV
http://www.idescat.cat/economia/inec?tc=5&id=0608&lang=es&cp=04&x=7&y=10
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
I/2001 II/2001 III/2001 IV/2001 I/2002 II/2002 III/2002 IV/2002 I/2003 II/2003 III/2003 IV/2003 I/2004 II/2004 III/2004 IV/2004 I/2005 II/2005 III/2005 IV/2005 I/2006 II/2006 III/2006 IV/2006 I/2007 II/2007 III/2007 IV/2007 I/2008 II/2008 III/2008 IV/2008 I/2009 II/2009 III/2009 IV/2009 I/2010 II/2010 III/2010 IV/2010 I/2011 II/2011 III/2011 IV/2011 I/2012 II/2012 III/2012 IV/2012 I/2013 II/2013 III/2013 IV/2013 I/2014 II/2014 III/2014 IV/2014 I/2015 II/2015 III/2015 IV/2015 I/2016 II/2016 III/2016 IV/2016


Okun's law
↓ Y
(aggregate
production)
↓ AD
(aggregate
expenditure)
↑ u
(unemployment
rate)
↓ π
(inflation
rate)
Phillips curve

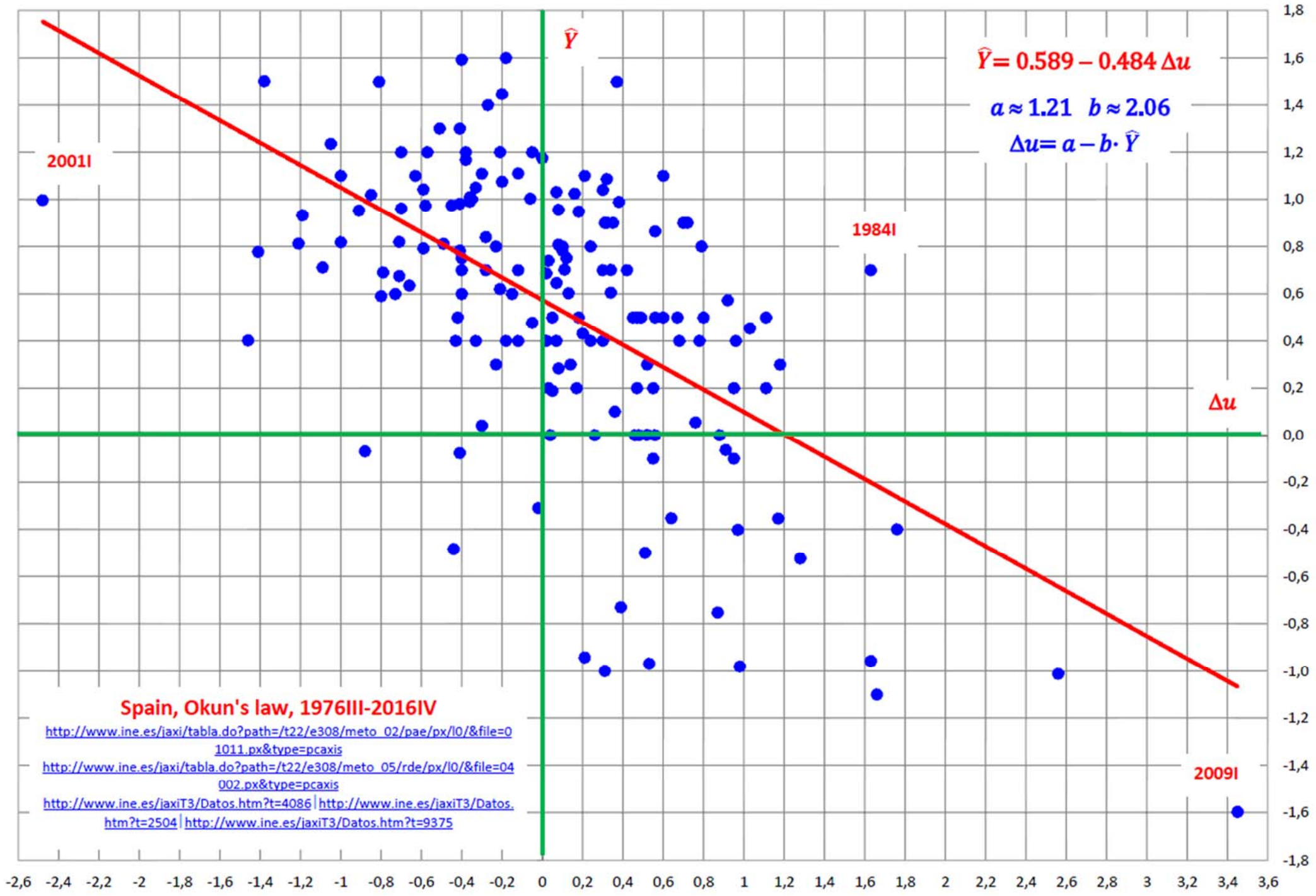


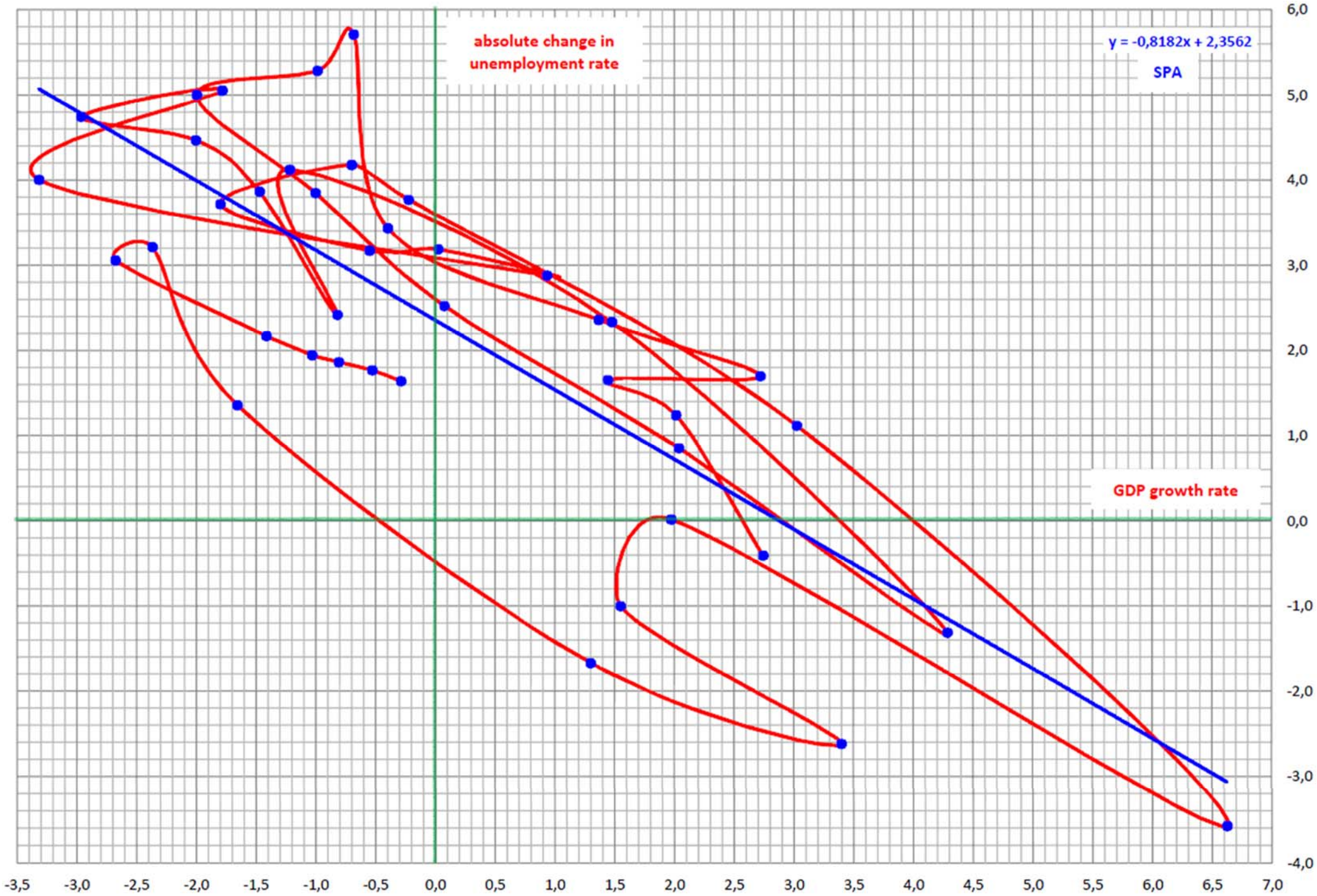
Spain, Okun's law, 1976III-2016IV

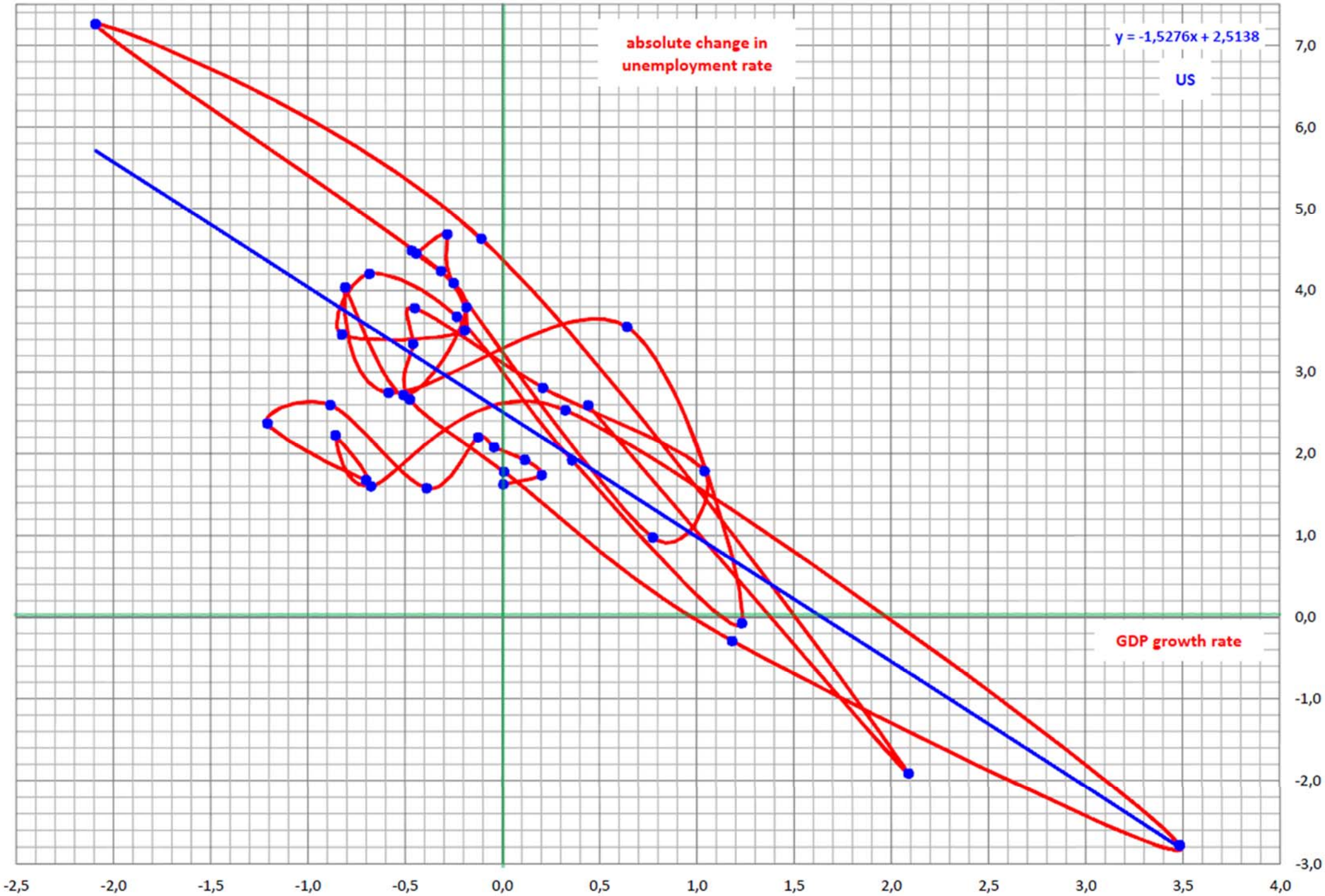
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_02/pae/px/l0/&file=01011.px&type=pcaxis

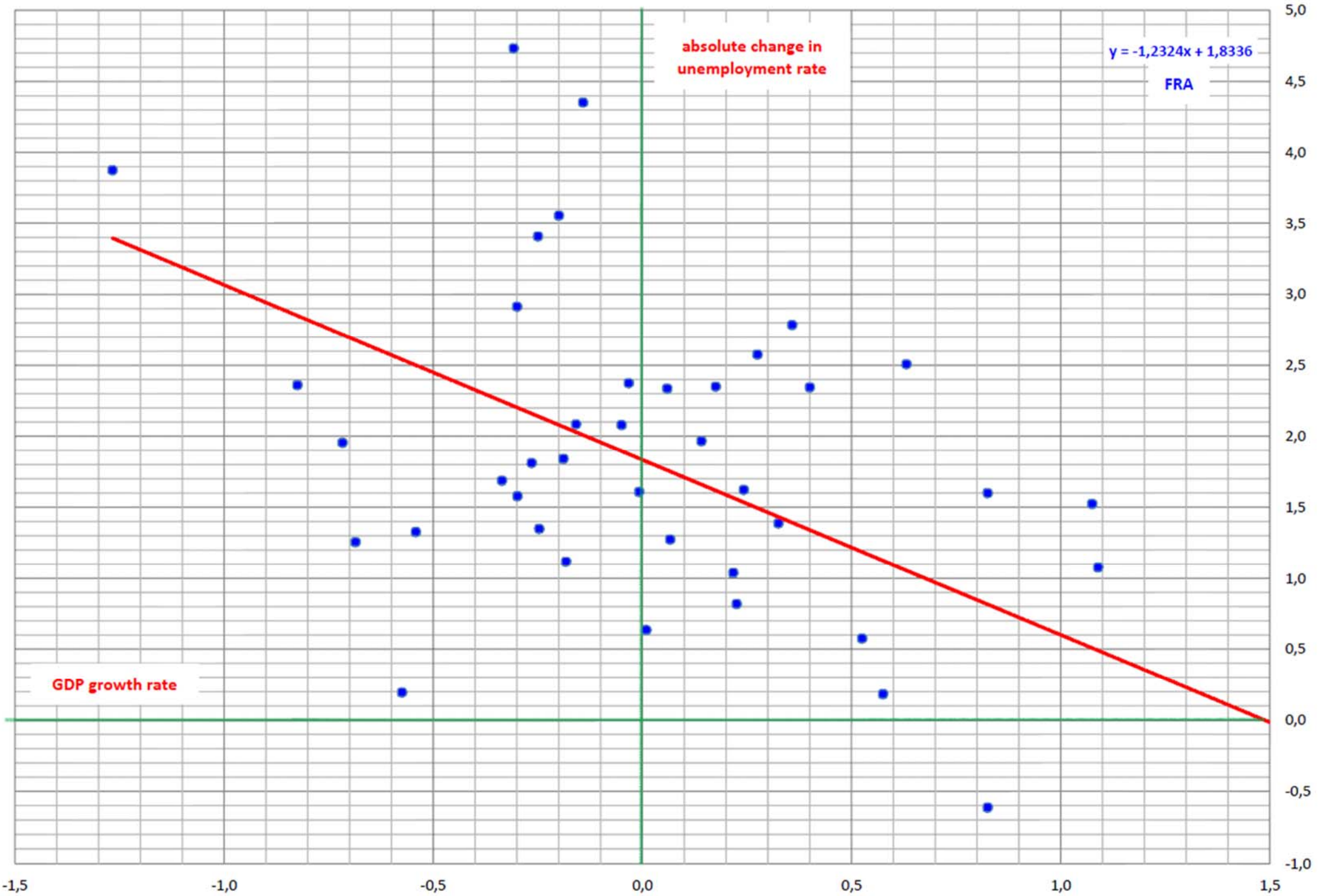
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_05/rde/px/l0/&file=04002.px&type=pcaxis

http://www.ine.es/jaxiT3/Datos.htm?t=4086 | http://www.ine.es/jaxiT3/Datos.htm?t=2504 | http://www.ine.es/jaxiT3/Datos.htm?t=9375


$\hat{Y}$
$\hat{Y} = 0.589 - 0.484\,\Delta u$
$a \approx 1.21 \quad b \approx 2.06$
$\Delta u = a - b \cdot \hat{Y}$
2001I
1984I
2009I
Δu
Spain, Okun's law, 1976III-2016IV
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_02/pae/px/l0/&file=01011.px&type=pcaxis
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_05/rde/px/l0/&file=04002.px&type=pcaxis
http://www.ine.es/jaxiT3/Datos.htm?t=4086 | http://www.ine.es/jaxiT3/Datos.htm?t=2504 | http://www.ine.es/jaxiT3/Datos.htm?t=9375
1,8 1,6 1,4 1,2 1,0 0,8 0,6 0,4 0,2 0,0 -0,2 -0,4 -0,6 -0,8 -1,0 -1,2 -1,4 -1,6 -1,8
-2,6 -2,4 -2,2 -2 -1,8 -1,6 -1,4 -1,2 -1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1 1,2 1,4 1,6 1,8 2 2,2 2,4 2,6 2,8 3 3,2 3,4 3,6


absolute change in unemployment rate
y = -0,8182x + 2,3562
SPA
GDP growth rate
6,0
5,0
4,0
3,0
2,0
1,0
0,0
-1,0
-2,0
-3,0
-4,0
-3,5
-3,0
-2,5
-2,0
-1,5
-1,0
-0,5
0,0
0,5
1,0
1,5
2,0
2,5
3,0
3,5
4,0
4,5
5,0
5,5
6,0
6,5
7,0


absolute change in unemployment rate
y = -1,5276x + 2,5138
US
GDP growth rate
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
-1,0
-2,0
-3,0
-2,5
-2,0
-1,5
-1,0
-0,5
0,0
0,5
1,0
1,5
2,0
2,5
3,0
3,5
4,0


absolute change in unemployment rate
y = -1,2324x + 1,8336
FRA
GDP growth rate
5,0
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
-0,5
-1,0
-1,5
-1,0
-0,5
0,0
0,5
1,0
1,5

absolute change in unemployment rate
y = -1,0857x + 1,1545
ITA
GDP growth rate
6,0
5,0
4,0
3,0
2,0
1,0
0,0
-1,0
-2,0
-3,0
-4,0
-5,0
-6,0
-1,5
-1,0
-0,5
0,0
0,5
1,0
1,5
2,0
2,5

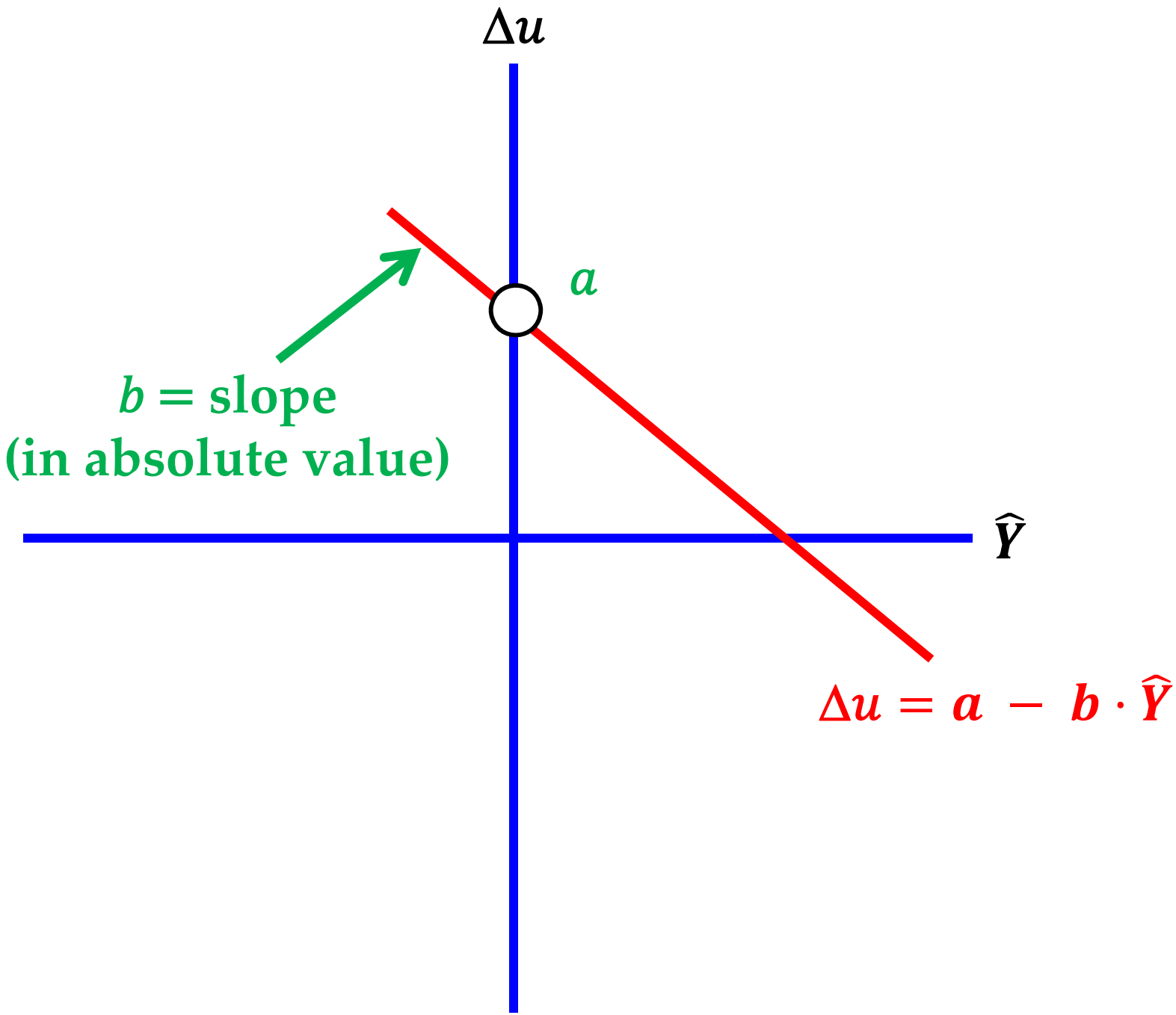
Okun's law

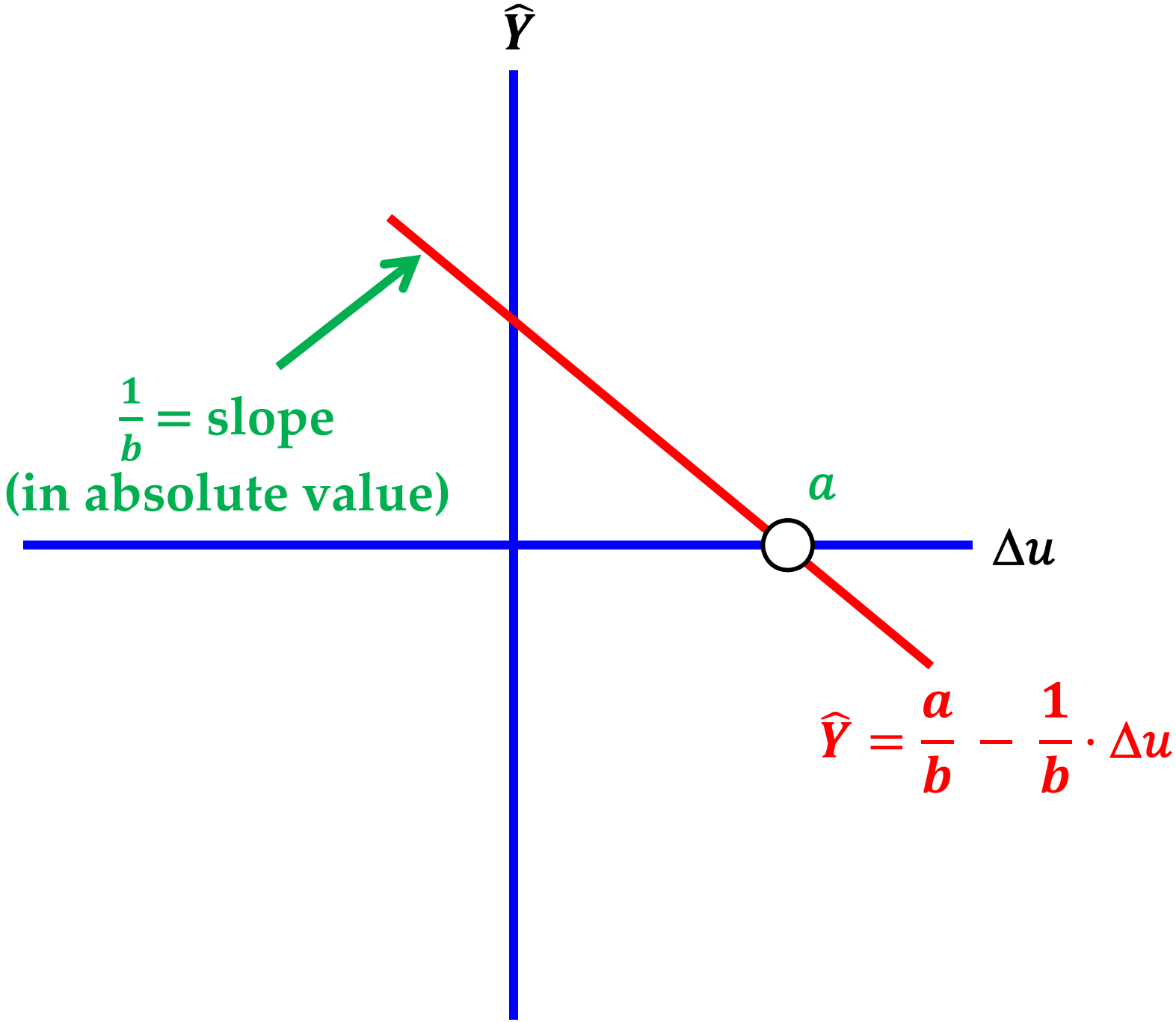
- Okun's law is an empirical relationship suggested in 1962 by the US economist Arthur Okun (1928-80).

- Okun's law: there is a negative relationship between the change $\Delta u = u - u_{-1}$ in the unemployment rate and $\hat{Y} = \frac{Y - Y_{-1}}{Y_{-1}}$, the rate of growth of real GDP Y. A simple formal expression of the law is

$$\Delta u = a - b \cdot \hat{Y}$$

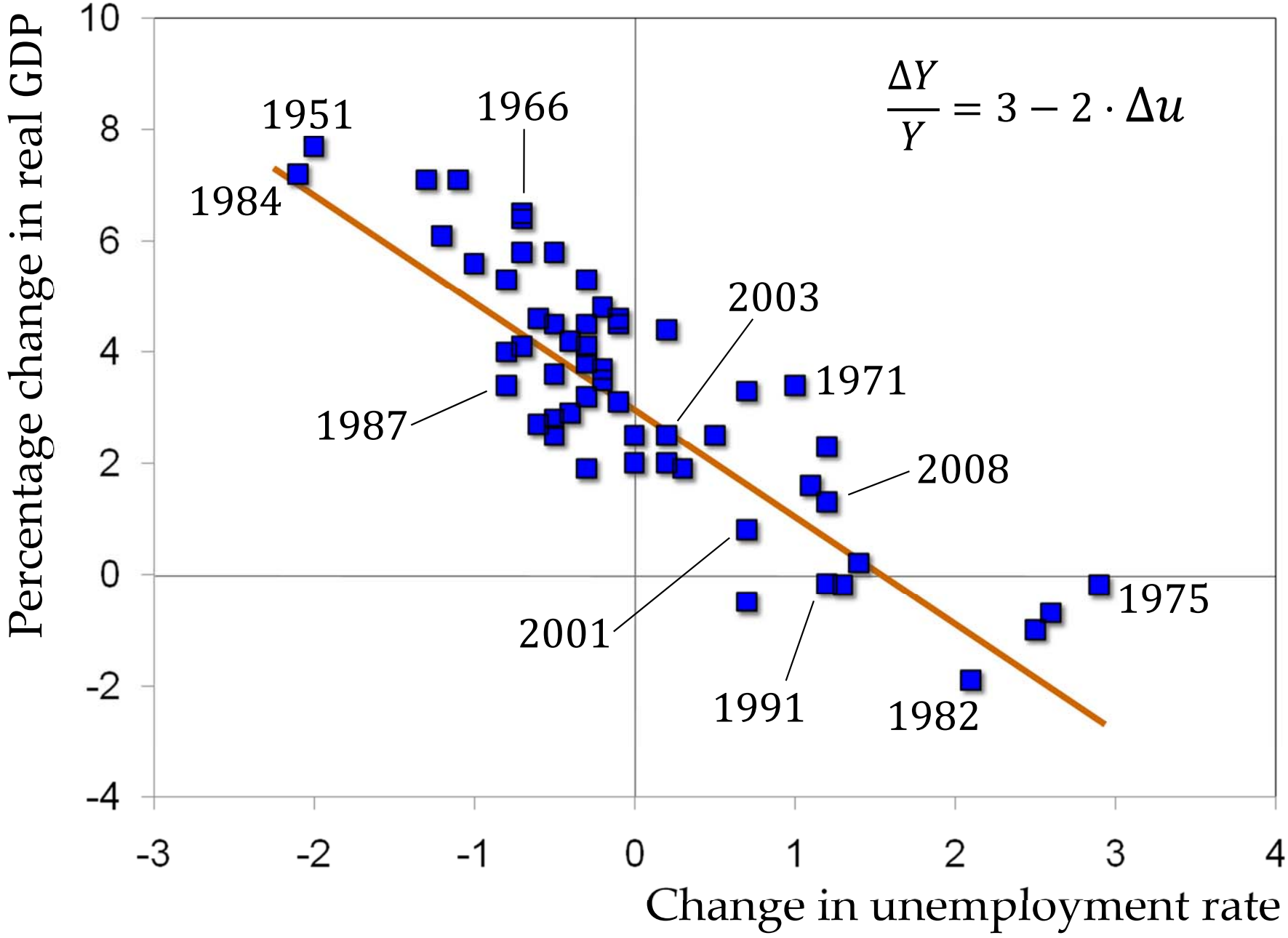
where a and b are positive constants that depend on the economy considered and the period with respect to which variables u and $\hat{Y}$ are measured.

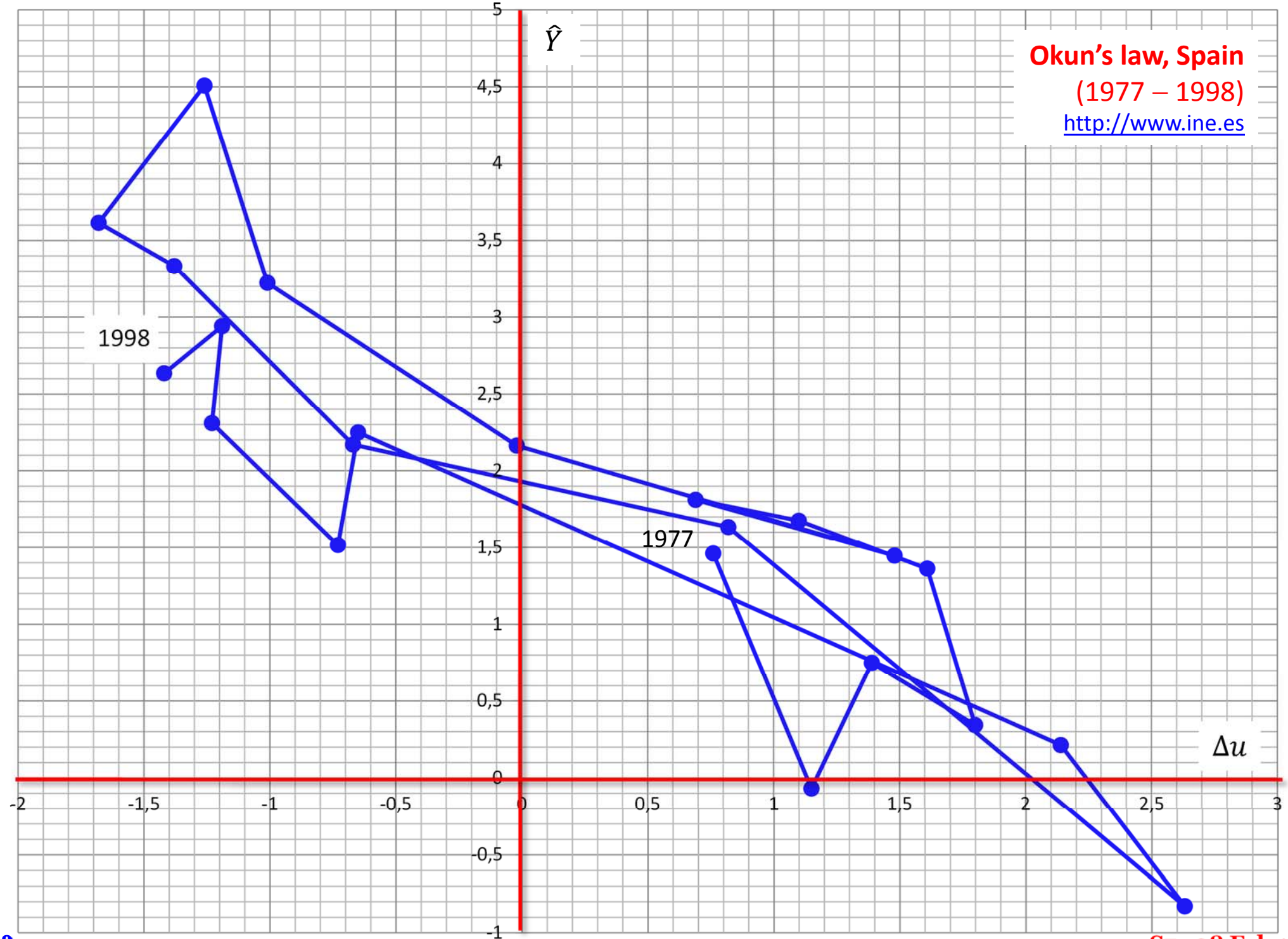

Δu
a
b = slope
(in absolute value)
$\widehat{Y}$
$\Delta u = a - b \cdot \widehat{Y}$


$\widehat{Y}$
$\frac{1}{b}$ = slope
(in absolute value)
a
Δu
$\widehat{Y} = \frac{a}{b} - \frac{1}{b} \cdot \Delta u$

Okun's law, US, 1951-2008

https://www2.bc.edu/~murphyro/EC204/PPT/CHAP09.ppt




Okun's law, Spain
(1977 – 1998)
http://www.ine.es
$\hat{Y}$
Δu
1998
1977
5
4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
-1
-2
-1,5
-1
-0,5
0
0,5
1
1,5
2
2,5
3

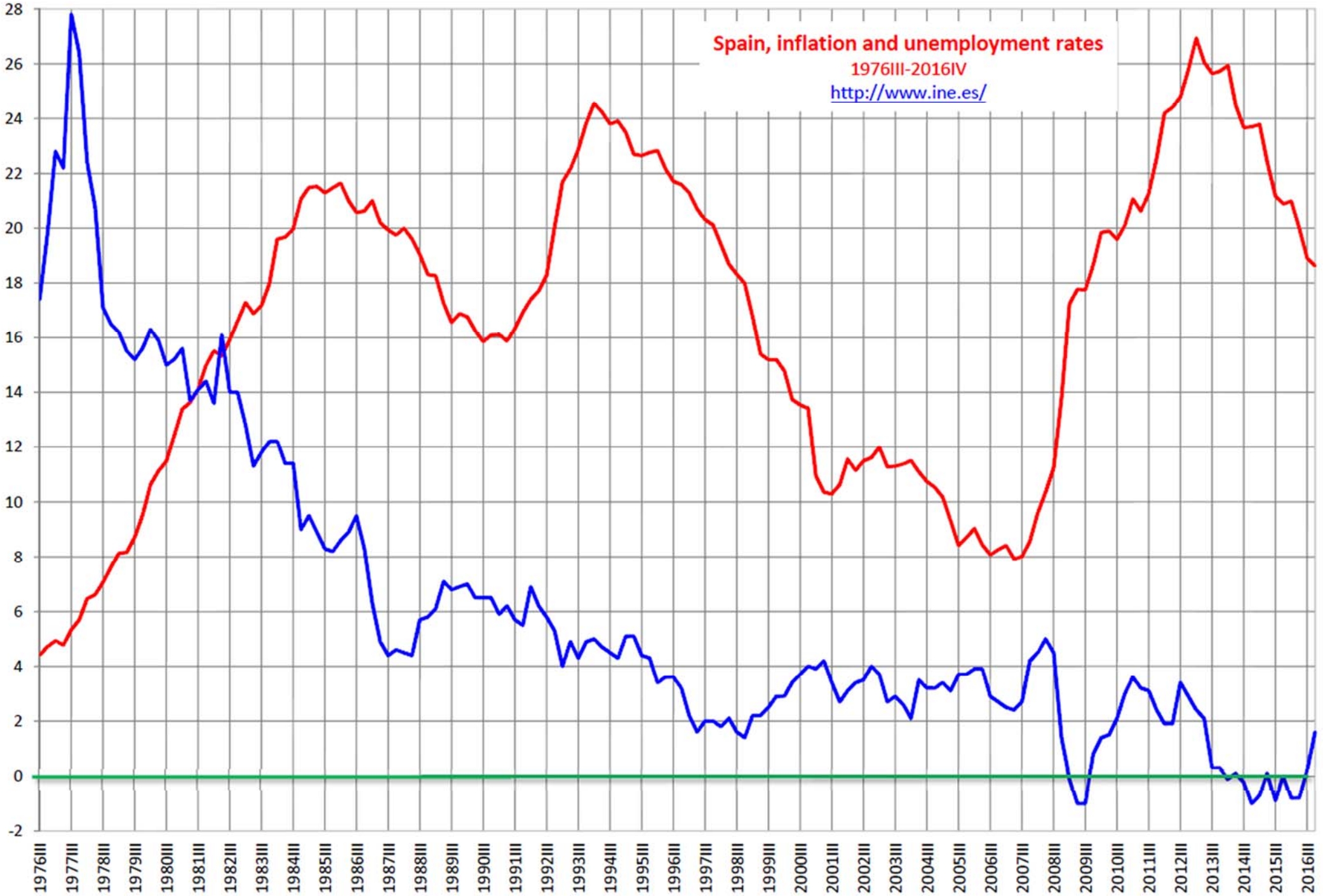
The Phillips curve

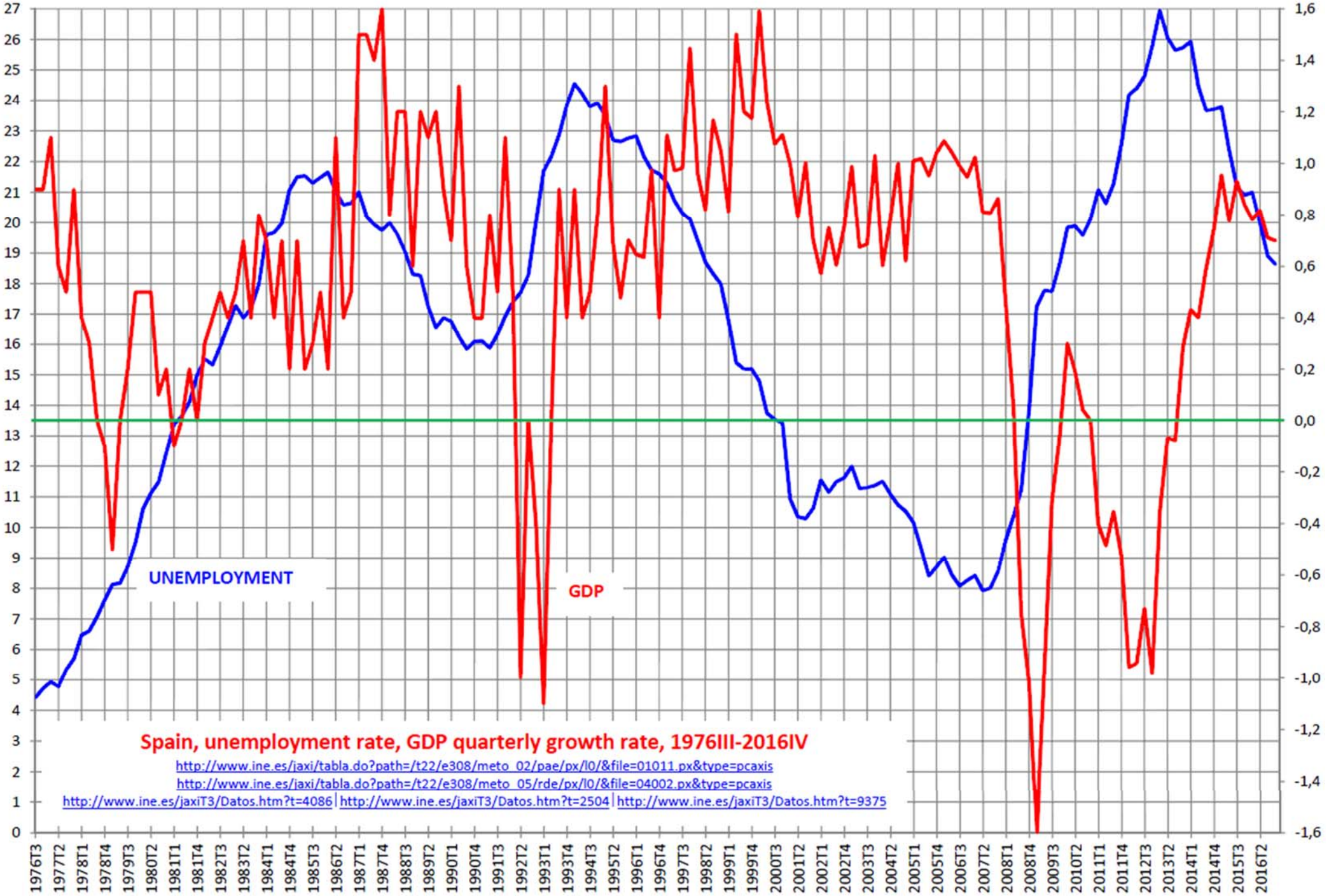
- It is an empirical relationship described in 1960 by Paul Samuelson and Robert Solow based on a 1958 paper by the New Zealand economist Alban William Housego Phillips (1914–1975).

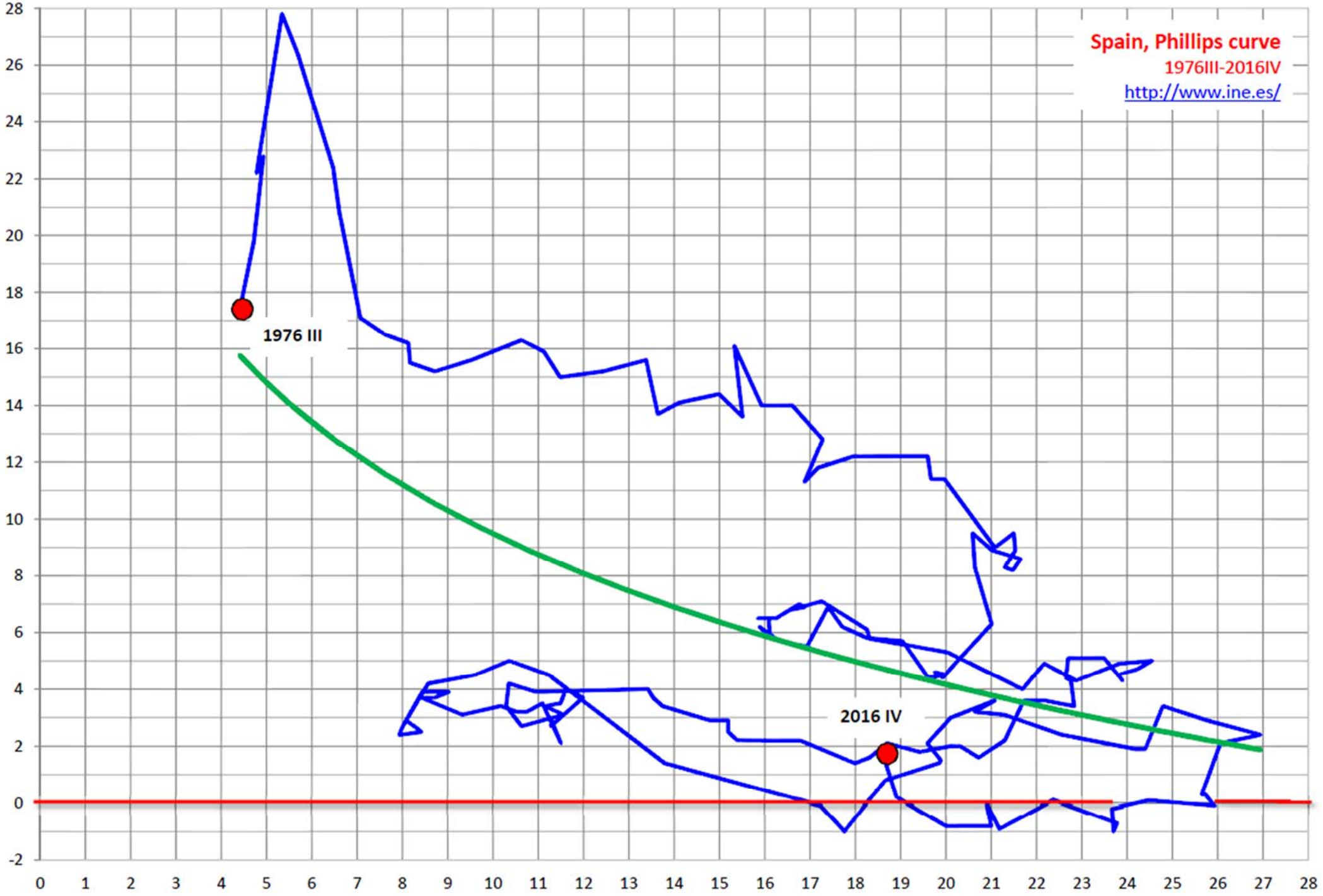
- The Phillips curve expresses a negative relationship between the unemployment rate u and the inflation rate π: the lower u, the higher π.

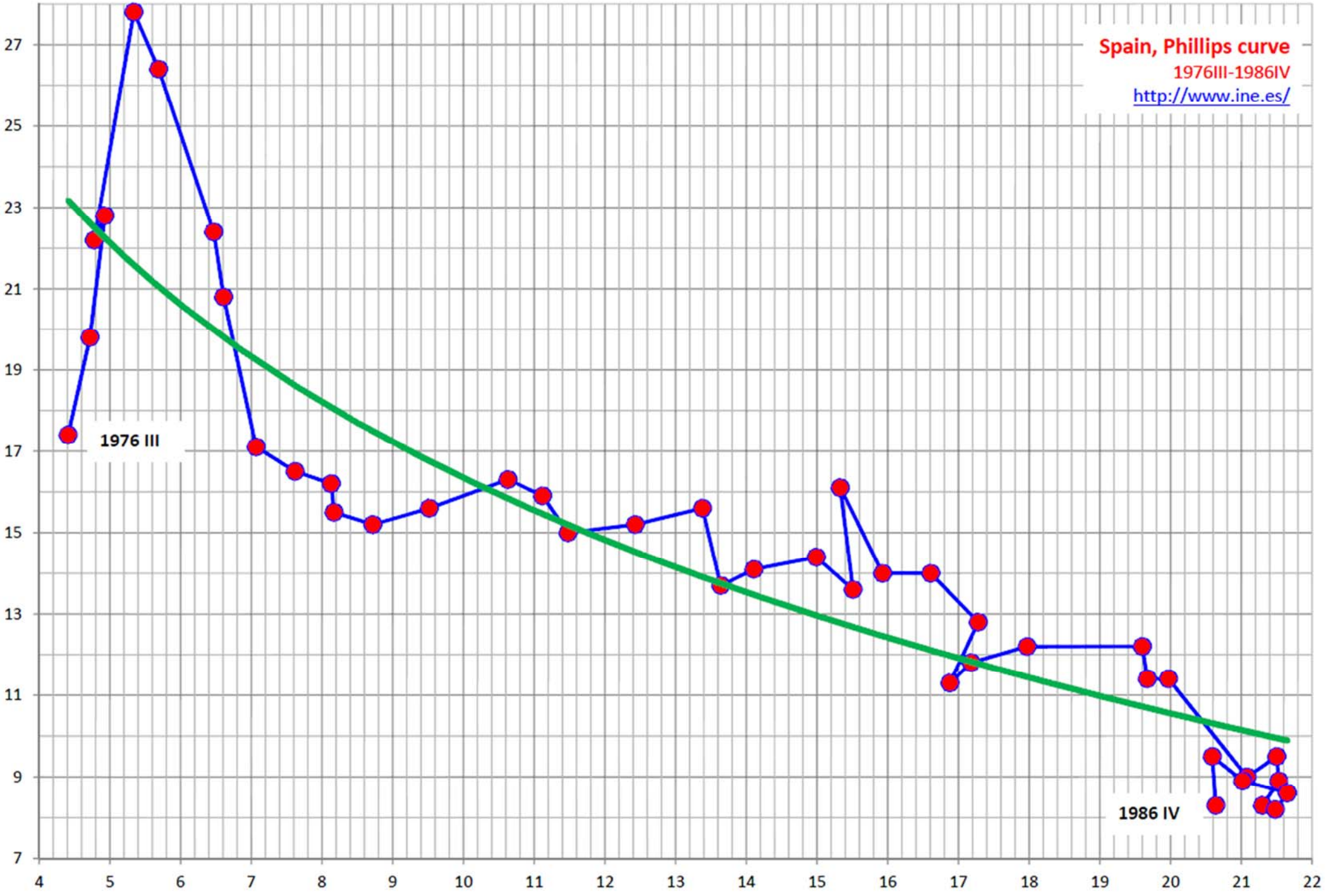
- With α and β positive constants, a linear Phillips curve is represented by an equation of the sort

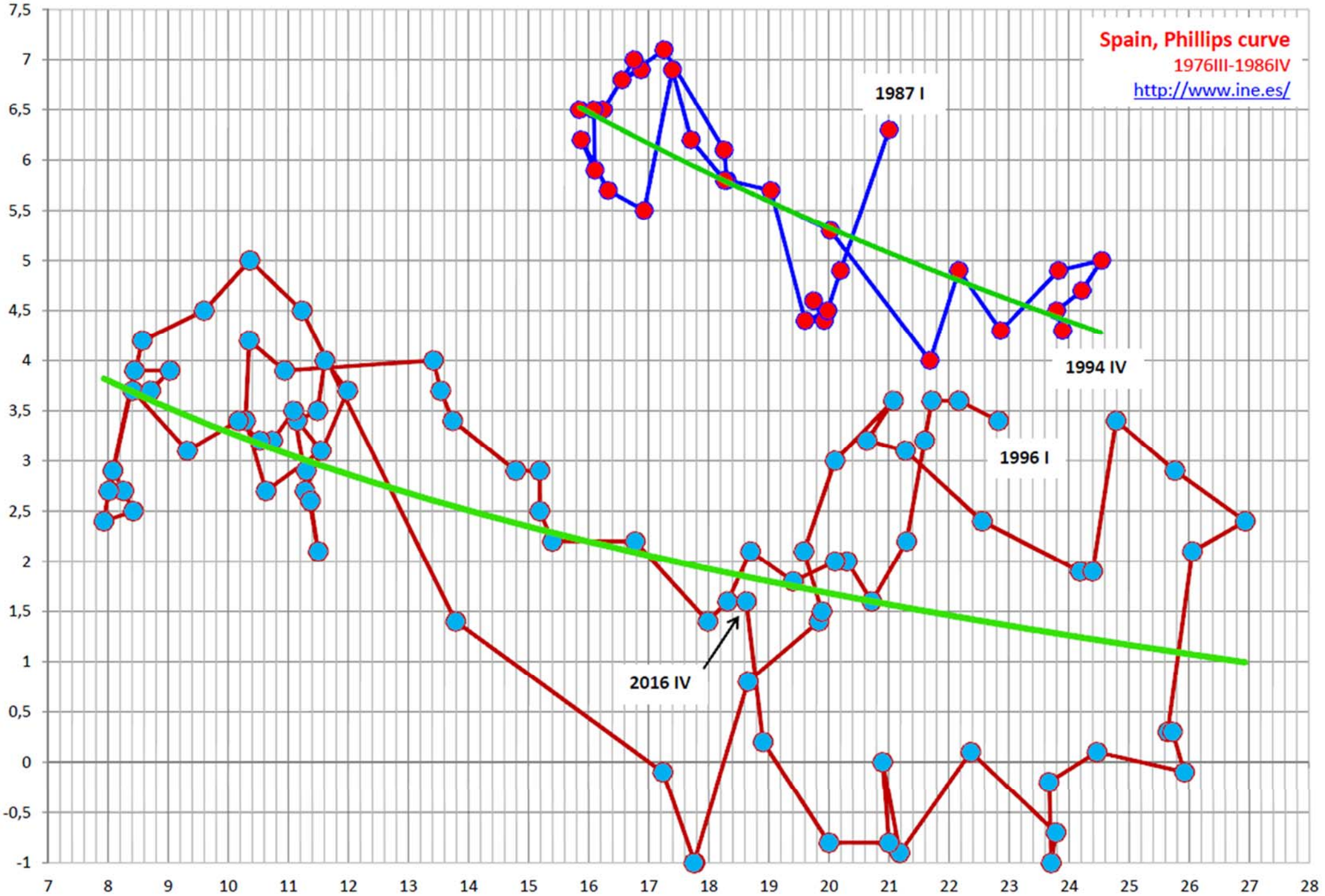
$$\pi = \alpha - \beta \cdot u \ .$$

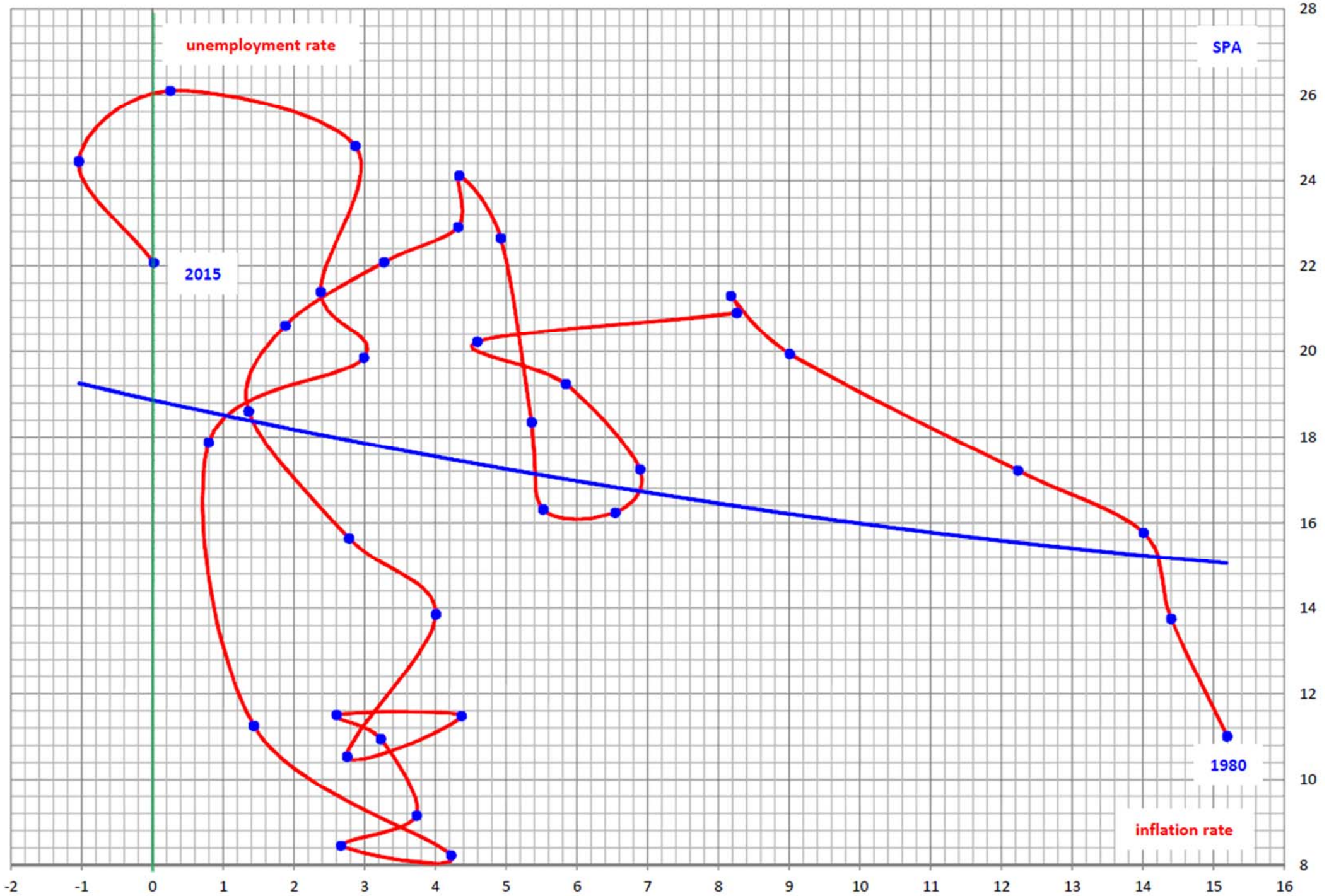

Spain, inflation and unemployment rates
1976III-2016IV
http://www.ine.es/
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
1976III
1977III
1978III
1979III
1980III
1981III
1982III
1983III
1984III
1985III
1986III
1987III
1988III
1989III
1990III
1991III
1992III
1993III
1994III
1995III
1996III
1997III
1998III
1999III
2000III
2001III
2002III
2003III
2004III
2005III
2006III
2007III
2008III
2009III
2010III
2011III
2012III
2013III
2014III
2015III
2016III

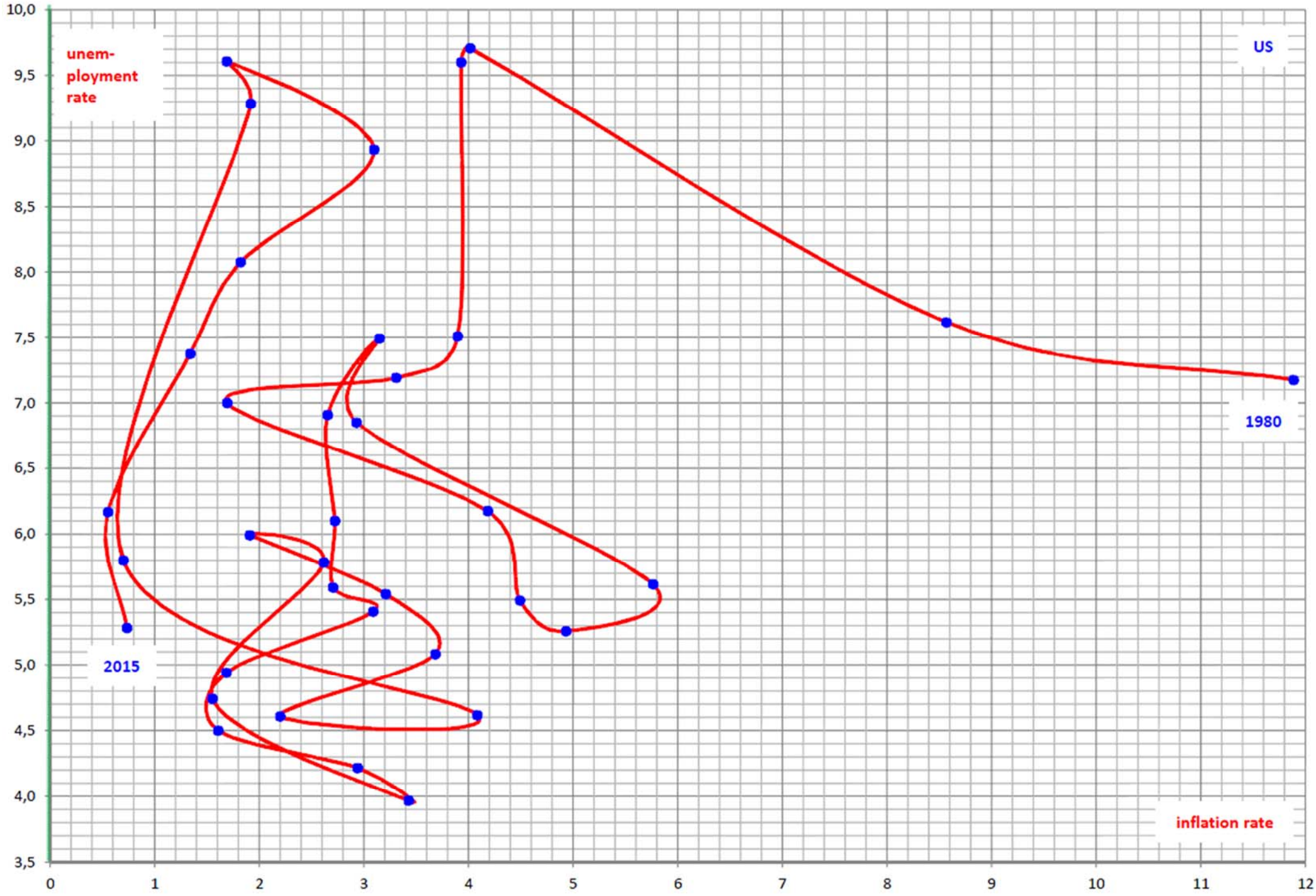

UNEMPLOYMENT
GDP
Spain, unemployment rate, GDP quarterly growth rate, 1976III-2016IV
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_02/pae/px/l0/&file=01011.px&type=pcaxis
http://www.ine.es/jaxi/tabla.do?path=/t22/e308/meto_05/rde/px/l0/&file=04002.px&type=pcaxis
http://www.ine.es/jaxiT3/Datos.htm?t=4086 | http://www.ine.es/jaxiT3/Datos.htm?t=2504 | http://www.ine.es/jaxiT3/Datos.htm?t=9375


Spain, Phillips curve
1976III-2016IV
http://www.ine.es/
1976 III
2016 IV
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

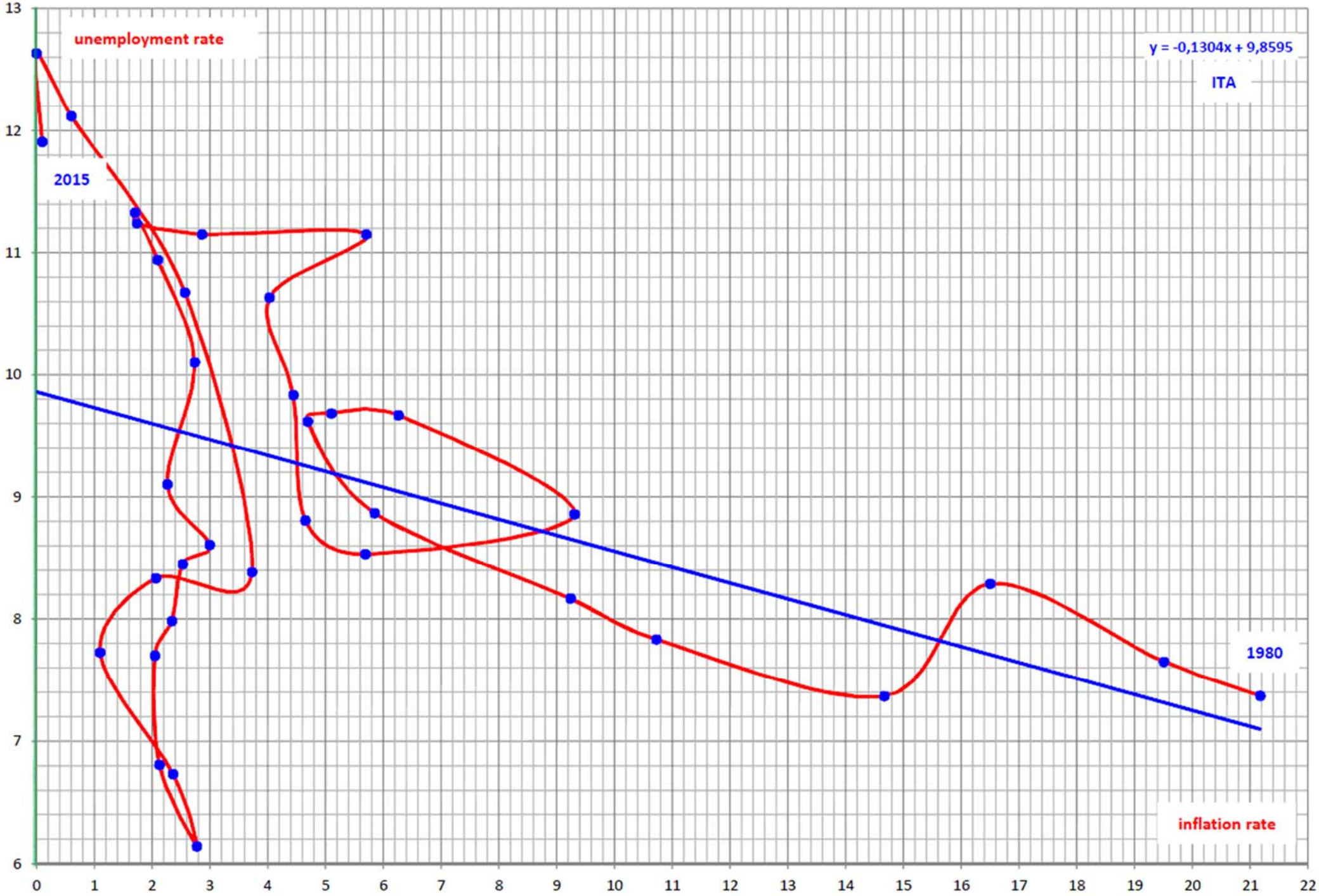

Spain, Phillips curve
1976III-1986IV
http://www.ine.es/
1976 III
1986 IV
27
25
23
21
19
17
15
13
11
9
7
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22


Spain, Phillips curve
1976III-1986IV
http://www.ine.es/
1987 I
1994 IV
1996 I
2016 IV
7,5
7
6,5
6
5,5
5
4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
-1
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28


unemployment rate
SPA
2015
1980
inflation rate
28
26
24
22
20
18
16
14
12
10
8
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


unem-
ployment
rate
US
1980
2015
inflation rate
10,0
9,5
9,0
8,5
8,0
7,5
7,0
6,5
6,0
5,5
5,0
4,5
4,0
3,5
0
1
2
3
4
5
6
7
8
9
10
11
12

FRA
2015
1980
unem-
ployment
rate
inflation rate
11
10
9
8
7
6
0
2
4
6
8
10
12
14


unemployment rate
y = -0,1304x + 9,8595
ITA
2015
1980
inflation rate
13
12
11
10
9
8
7
6
0
1
2
3
4
5
6
7
8
9
10
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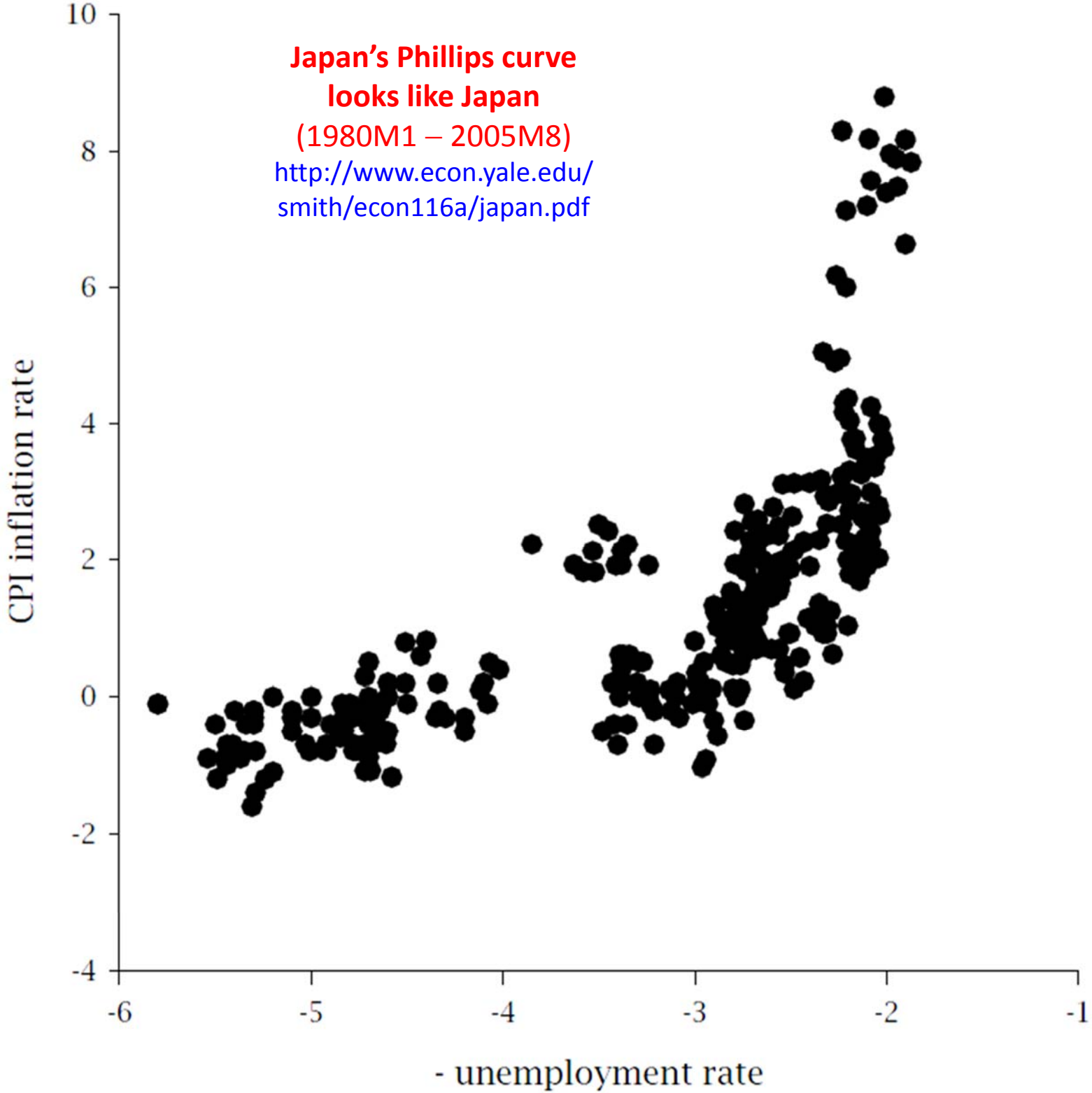
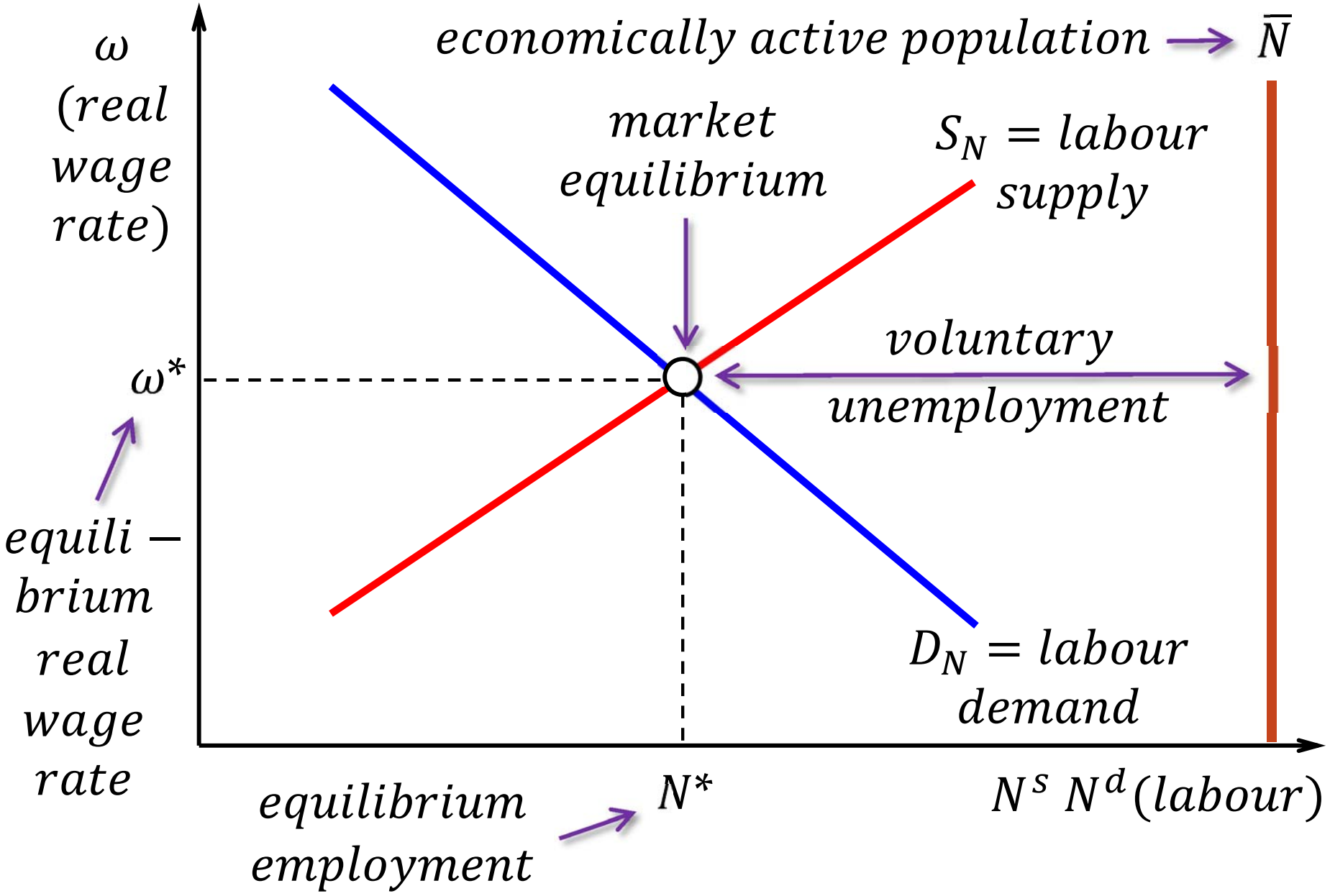
Japan's Phillips curve looks like Japan

(1980M1 – 2005M8)

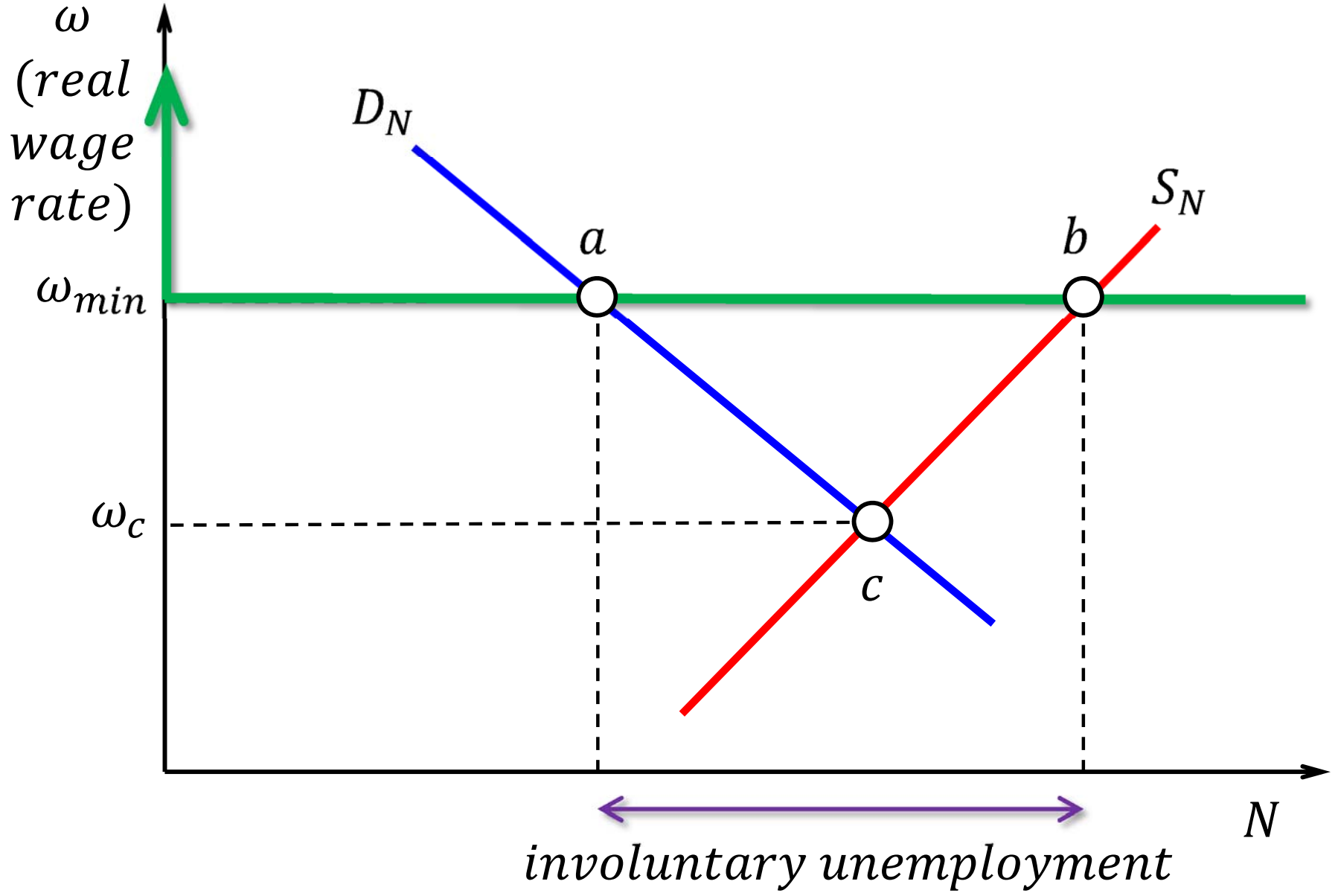
http://www.econ.yale.edu/smith/econ116a/japan.pdf



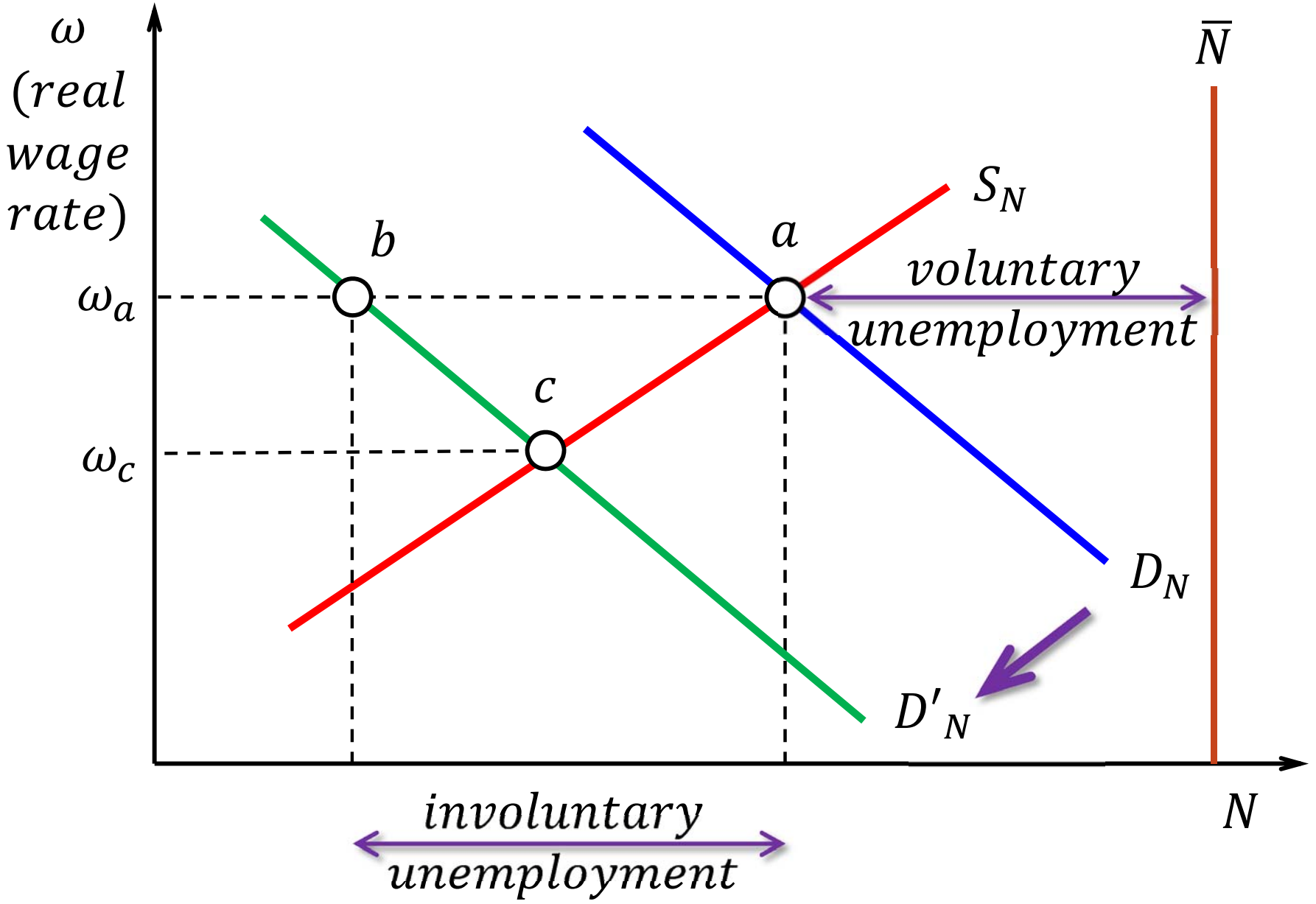
The classical labour market model



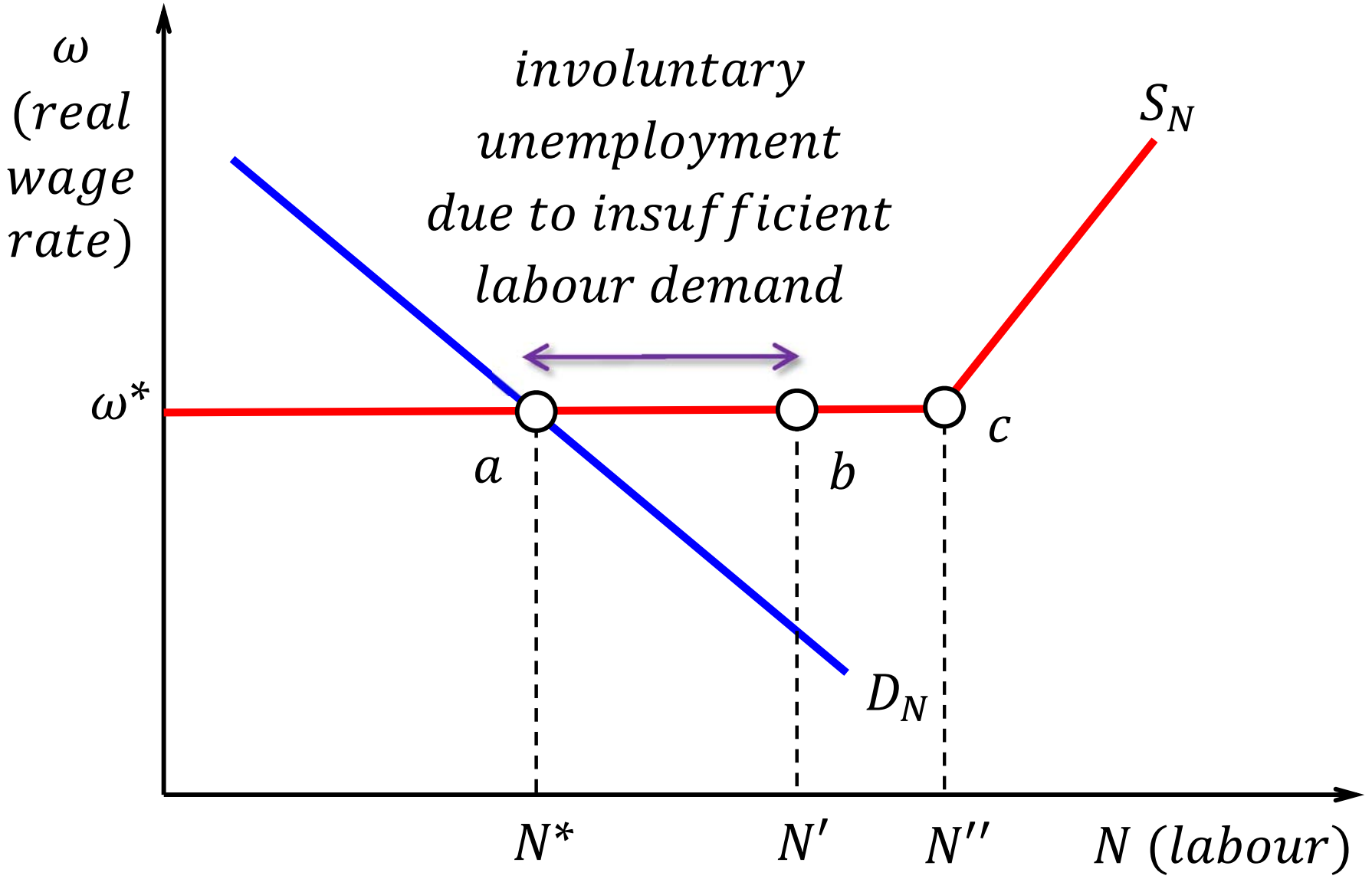
Unemployment in the classical model /1



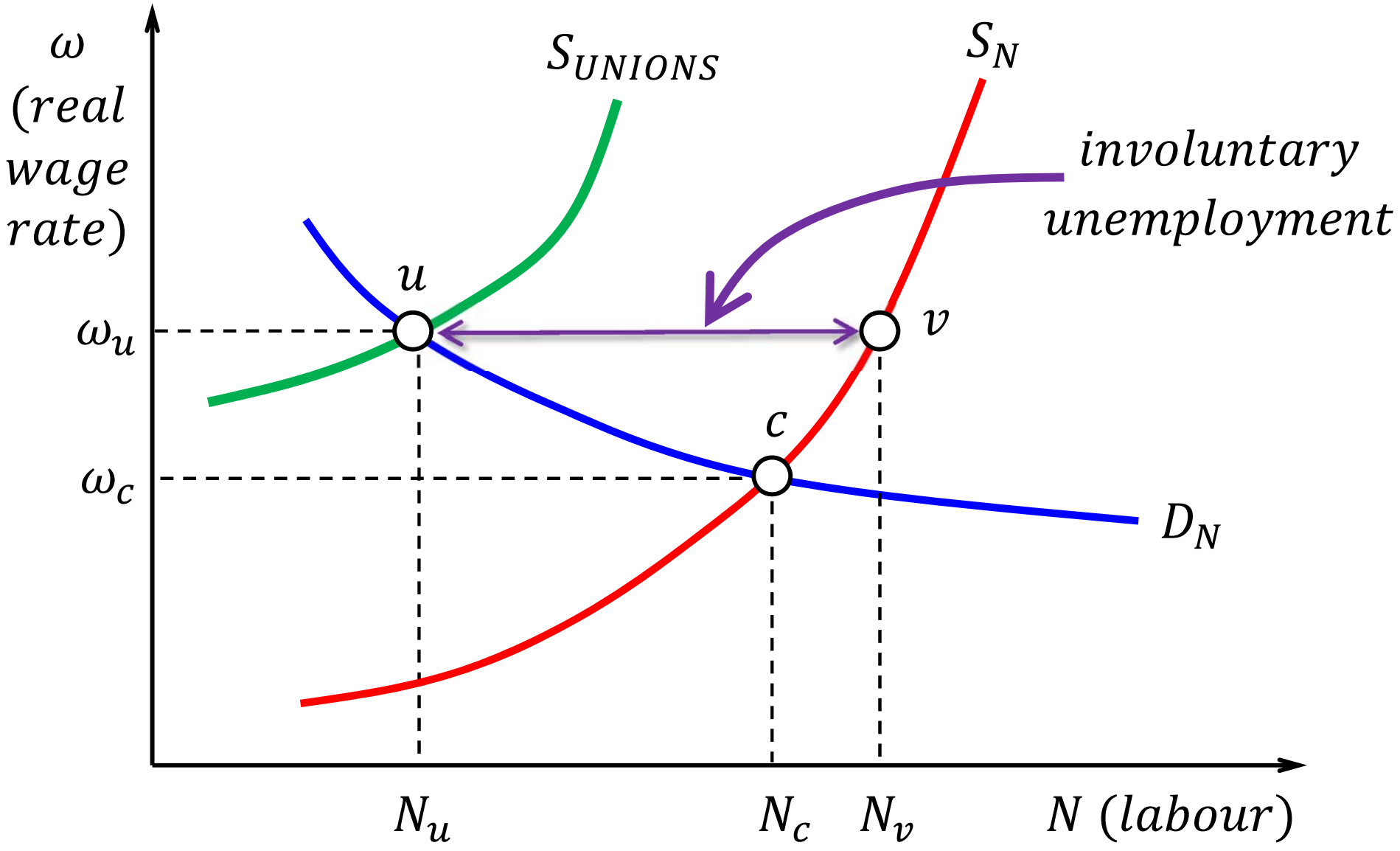
Unemployment in the classical model /2



Deficient demand



Supply-side market power: unions

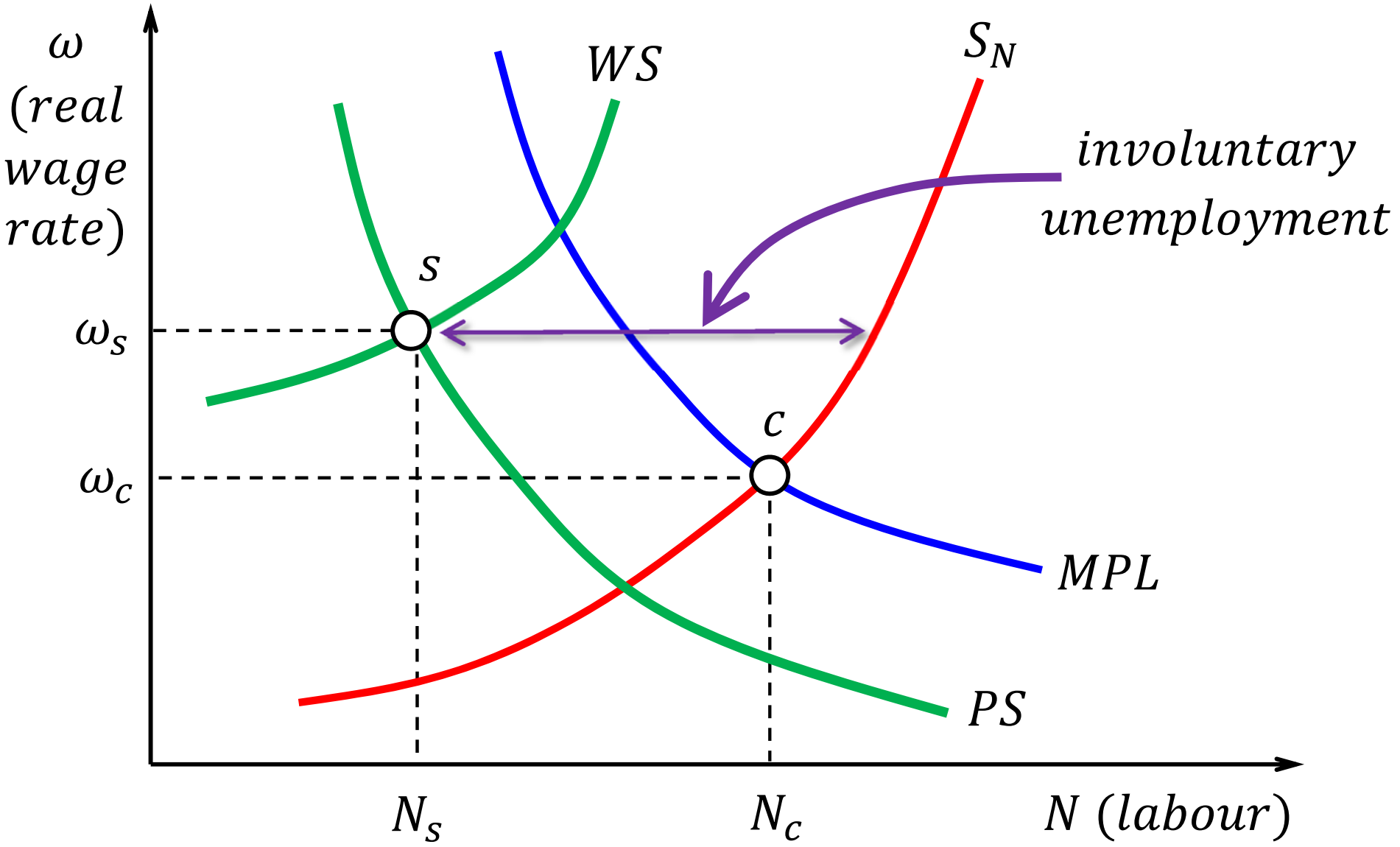


Fighting involuntary unemployment

- When the wage is "too high", the obvious solution to get rid of unemployment is to lower the wage (or let time pass by for the wage to adjust by itself).
- When unemployment is due to lack of labour demand, the natural solution is an aggregate demand expansion that induces firms to hire more workers to satisfy the additional demand.
- When the cause of unemployment is market power (unions), the solution seems harder to implement: how to reduce the unions' bargaining power without raising protests by part of the workers?

http://en.wikipedia.org/wiki/Trade_unions_in_the_United_Kingdom

The WS and PS model



Segmented labour market model

- Suppose workers may have or not some economically irrelevant feature that firms may like or not (for instance, being a man or not).
- Firms classify workers in two types (I and II) depending on whether they possess the feature or not. Some firms (type I firms) prefer type I workers; the rest (type II) prefer type II workers.
- Each type of firms defines a different (competitive) labour market. Workers are unaware of the fact that there are two types of firms. From their perspective, the labour market is not segmented.

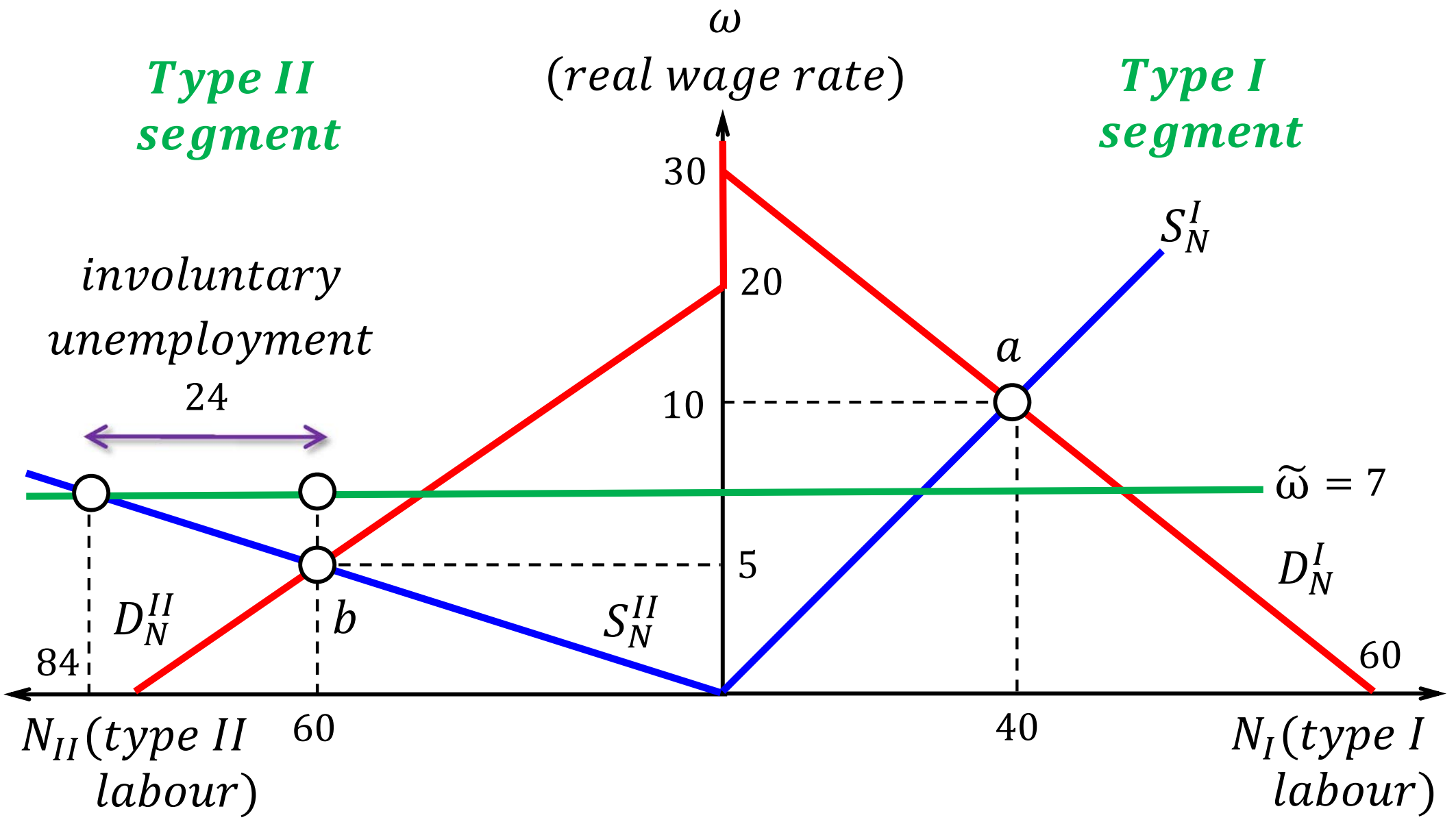
Example /1

- Supply of labour function of type I workers: $S_N^I = 4 \cdot \omega$ (ω is the real wage rate).
- Demand for labour function of type I firms: $D_N^I = 60 - 2 \cdot \omega$ ($N_I^d = 0$ if $\omega > 30$).
- Market equilibrium (type I): $(N_I, \omega_I) = (40, 10)$.
- Supply of labour function of type II workers: $S_N^{II} = 12 \cdot \omega$.
- Demand for labour function of type II firms: $D_N^{II} = 80 - 4 \cdot \omega$ ($N_{II}^d = 0$ if $\omega > 20$).
- Market equilibrium (type II): $(N_{II}, \omega_{II}) = (60, 5)$.

Example /2

- $\frac{40}{40+60} = \frac{2}{5} = 40\%$ of employment corresponds to type I workers and $\frac{60}{40+60} = \frac{3}{5} = 60\%$ to type II. Using these weights, the average real wage rate would be $\tilde{\omega} = \frac{2}{5} \cdot \omega_I + \frac{3}{5} \cdot \omega_{II} = \frac{2}{5} \cdot 10 + \frac{3}{5} \cdot 5 = 7$.
- At $\tilde{\omega} = 7$, no more type I workers than are actually employed would like to be hired. But, at $\tilde{\omega} = 7$, type II workers would like to supply $S_N^{II} = 12 \cdot \tilde{\omega} = 84$. Since employment of type II workers equals $N_{II} = 60$, involuntary unemployment appears to be $S_N^{II}(\tilde{\omega} = 7) - \quad N_{II} = 84 - 60 = 24$ (unemployment rate $= 24/(24 + N_I + N_{II}) = 19.3\%$); see next slide.

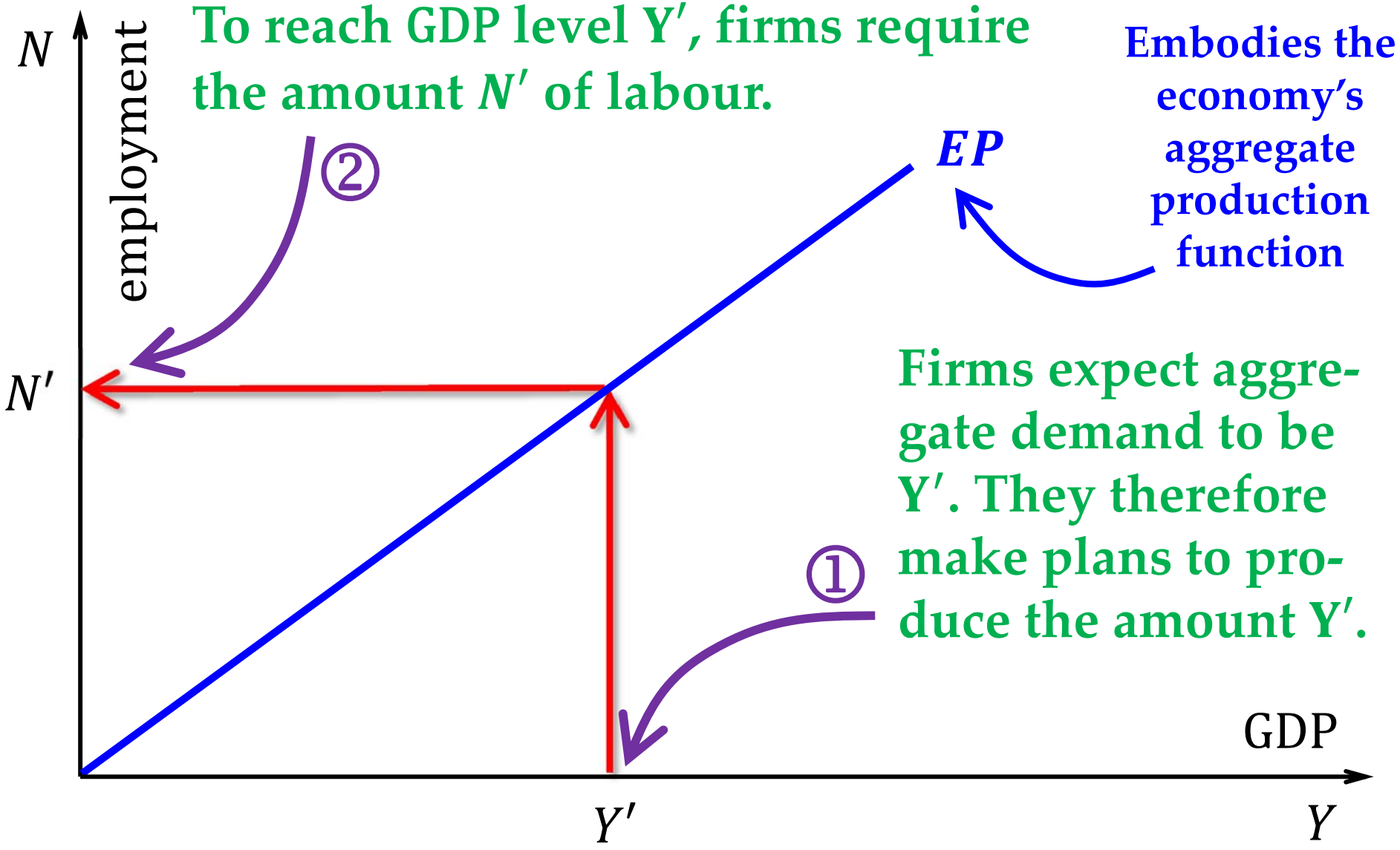
Though each segment is in equilibrium, there is a sense in which involuntary unemployment exists.



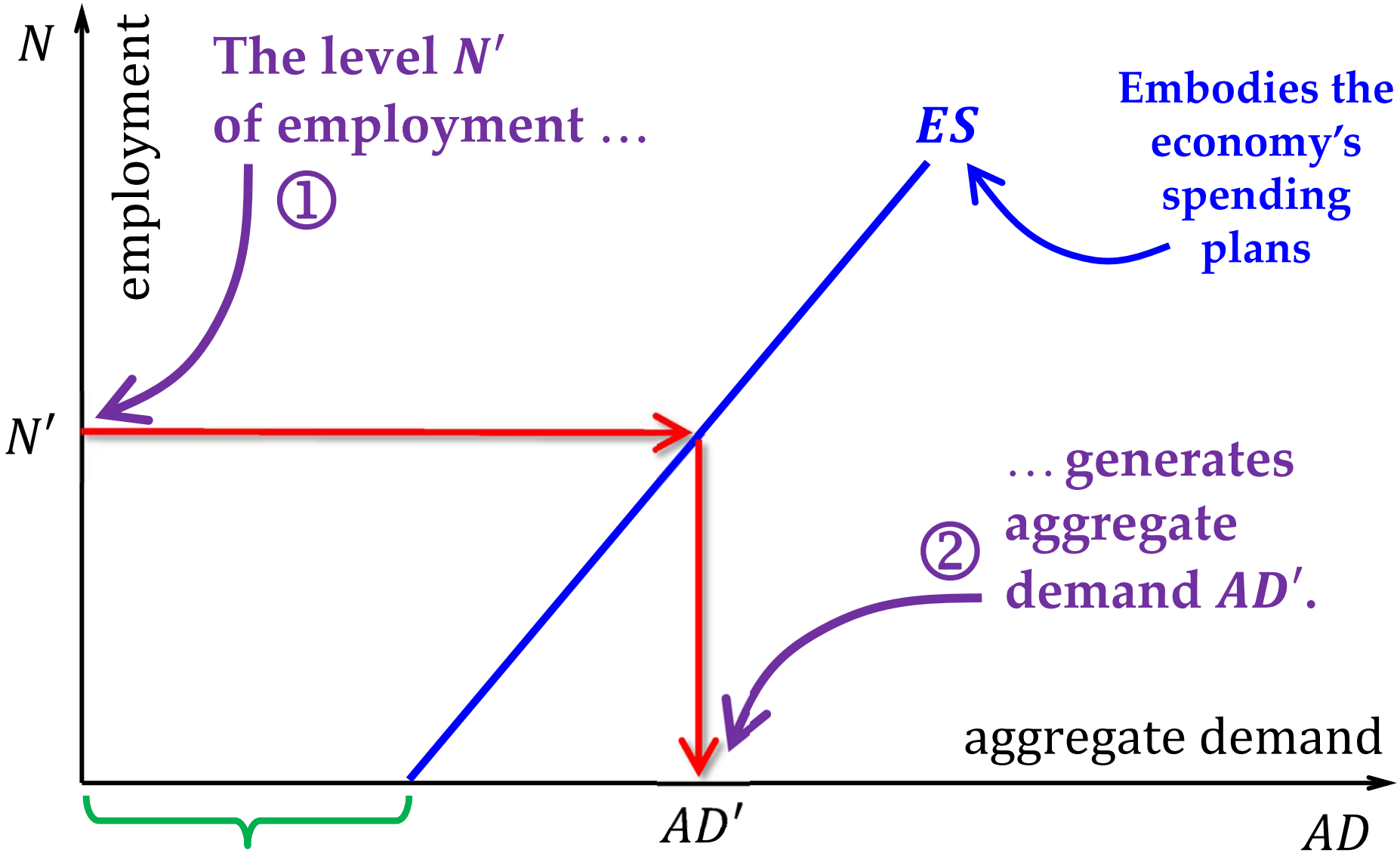
The E-PIS model

- It postulates three linear relations linking employment with production, income, and spending.
  - *EP* relation (production → employment): establishes the amount of employment required to reach a certain GDP level.
  - *EI* relation (income → employment): identifies the amount of labour supplied for every value of aggregate income.
  - *ES* relation (employment → expenditure): indicates the aggregate level of spending associated with any given amount of employment.

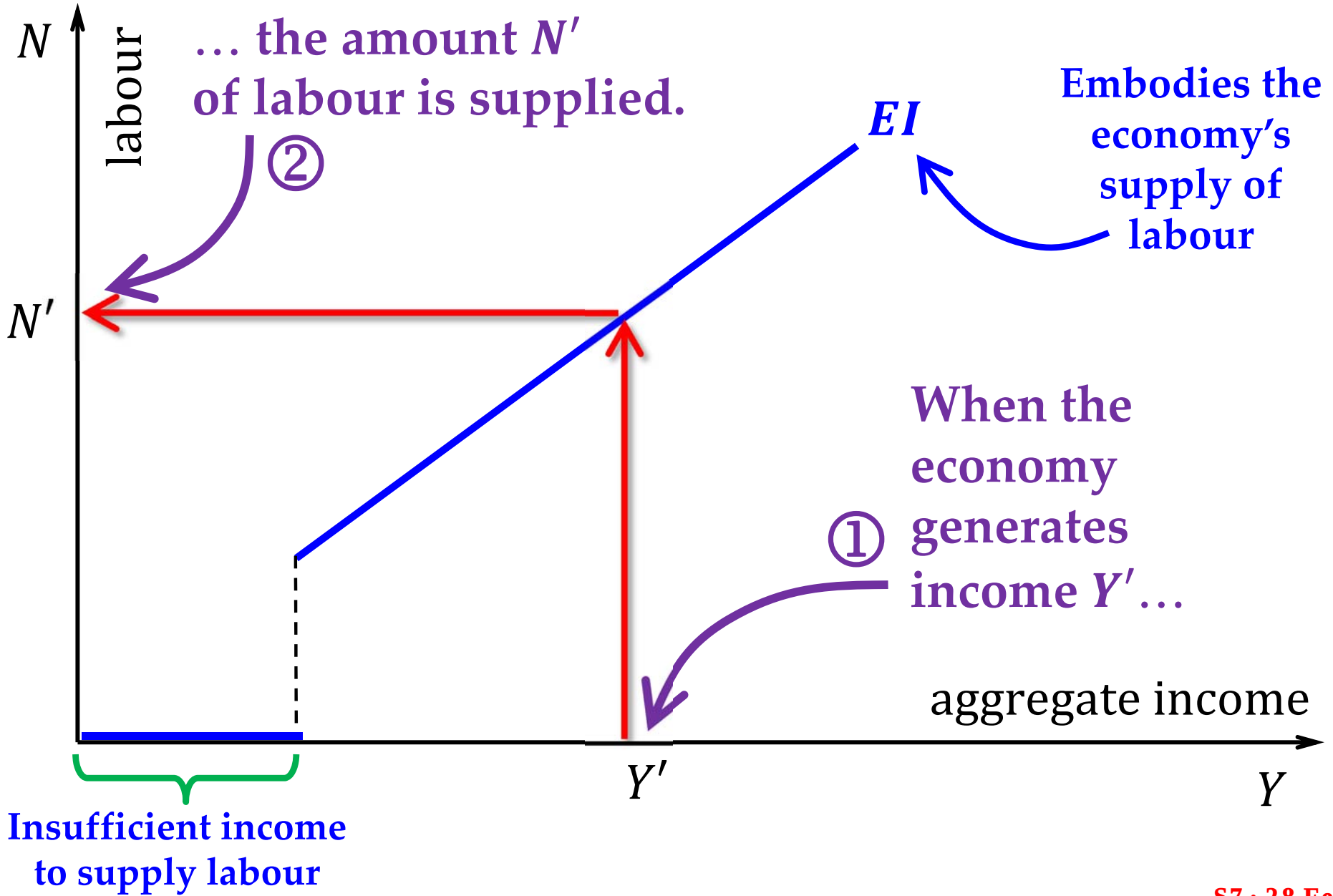
EP (employment-production) relation



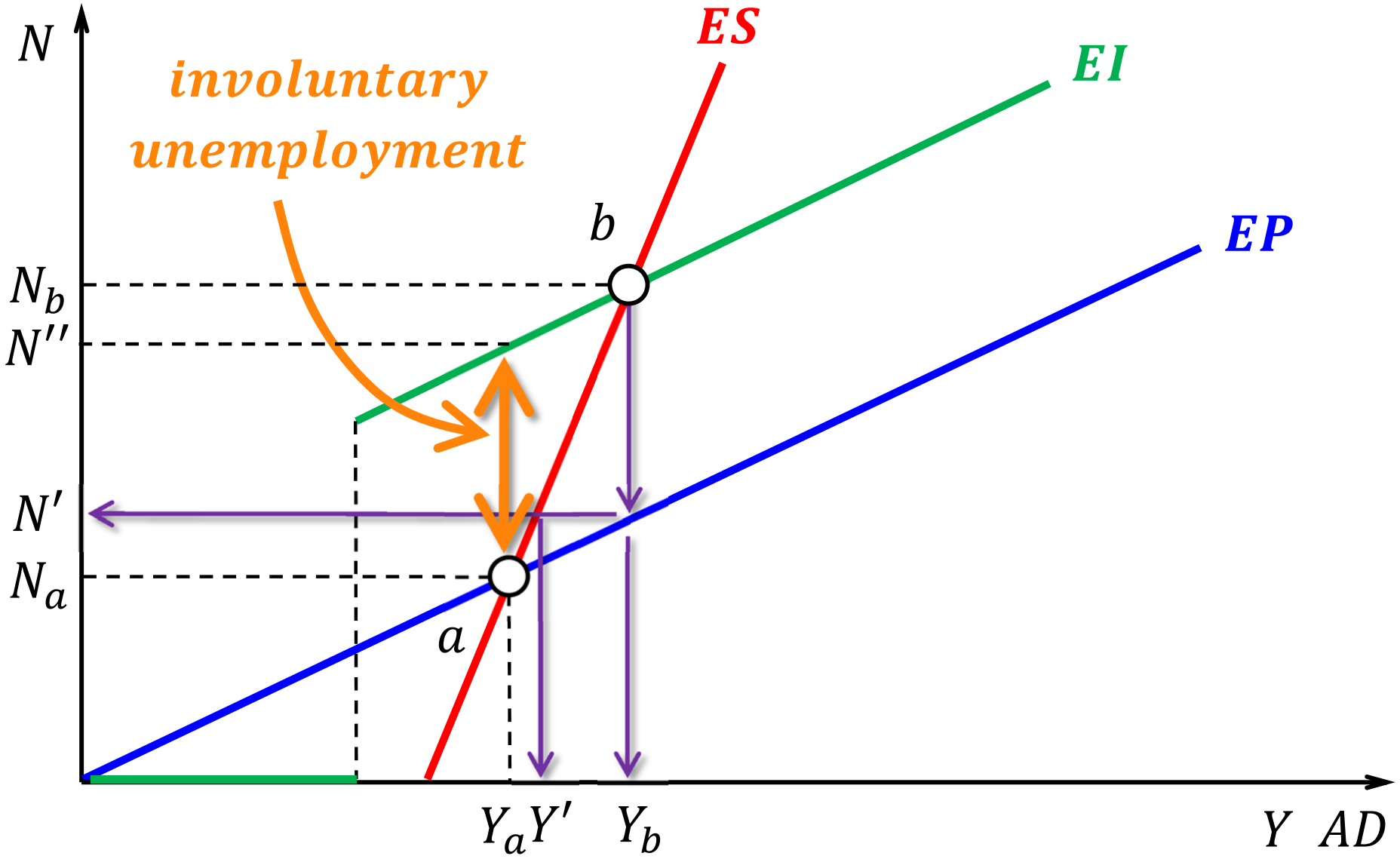
ES (employment-spending) relation



EI (employment-income) relation



Solving the E-PIS model /1



Solving the E-PIS model /2

- When drawn simultaneously, there is no point at which the three relations intersect.
- Without delving into details, let us assume that the solution is found at a point when two lines intersect. Leaving the origin aside, there are two candidates: point a and point b.
- Point b is not stable (self-sustained). At b, employment is N_b and aggregate demand is Y_b. But, according to EP, to produce Y_b, the economy only needs the amount $N' < N_b$ of labour. Hence, b does not represent a consistent state of the economy.

Solving the E-PIS model /3

- At a, employment is N_a and aggregate demand is Y_a. To generate a GDP equal to Y_a firms demand exactly the amount N_a of labour. In addition, the level N_a of employment generates precisely the level Y_a of aggregate demand. This state of the economy appears self-consistent and stable.
- The problem is that there is involuntary unemployment at point a. Given income Y_a, workers would like to supply the amount N'' of labour. Since employment at a is only N_a, $N'' - N_a$ defines the level of involuntary unemployment. Question: what shifts in the lines would reduce it?

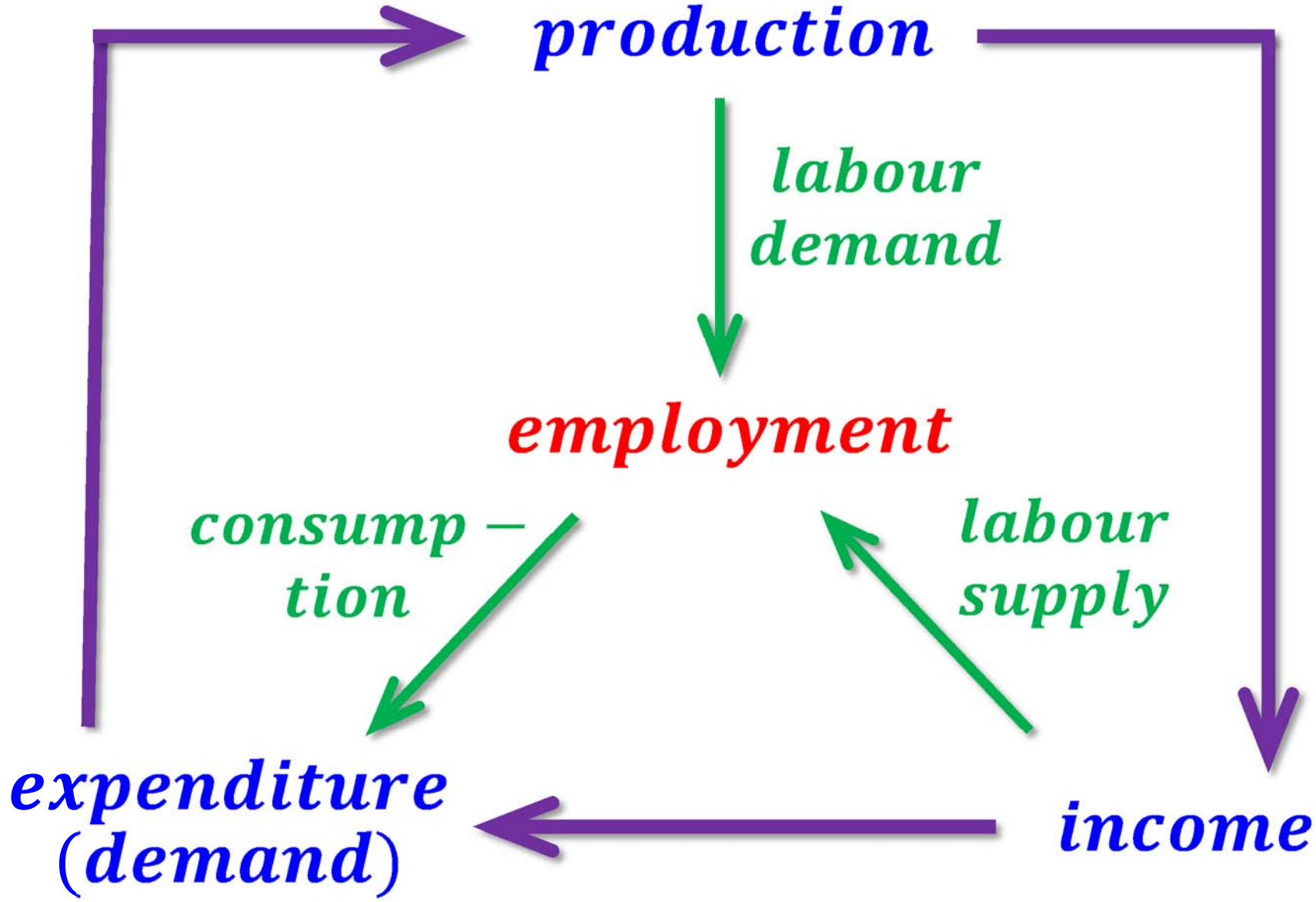
Interpreting the E-PIS model /1

- The arguably simplest description of an economy is given by the loop

production → income → expenditure → production → …

- The E-PIS model inserts labour in this loop. First, production creates a derived demand: the demand for labour. Second, the income the economy generates is a key variable helping workers to decide the amount of labour supplied.

- Lastly, the level of employment, once determined, significantly contributes to establish aggregate demand, which in turn affects production.

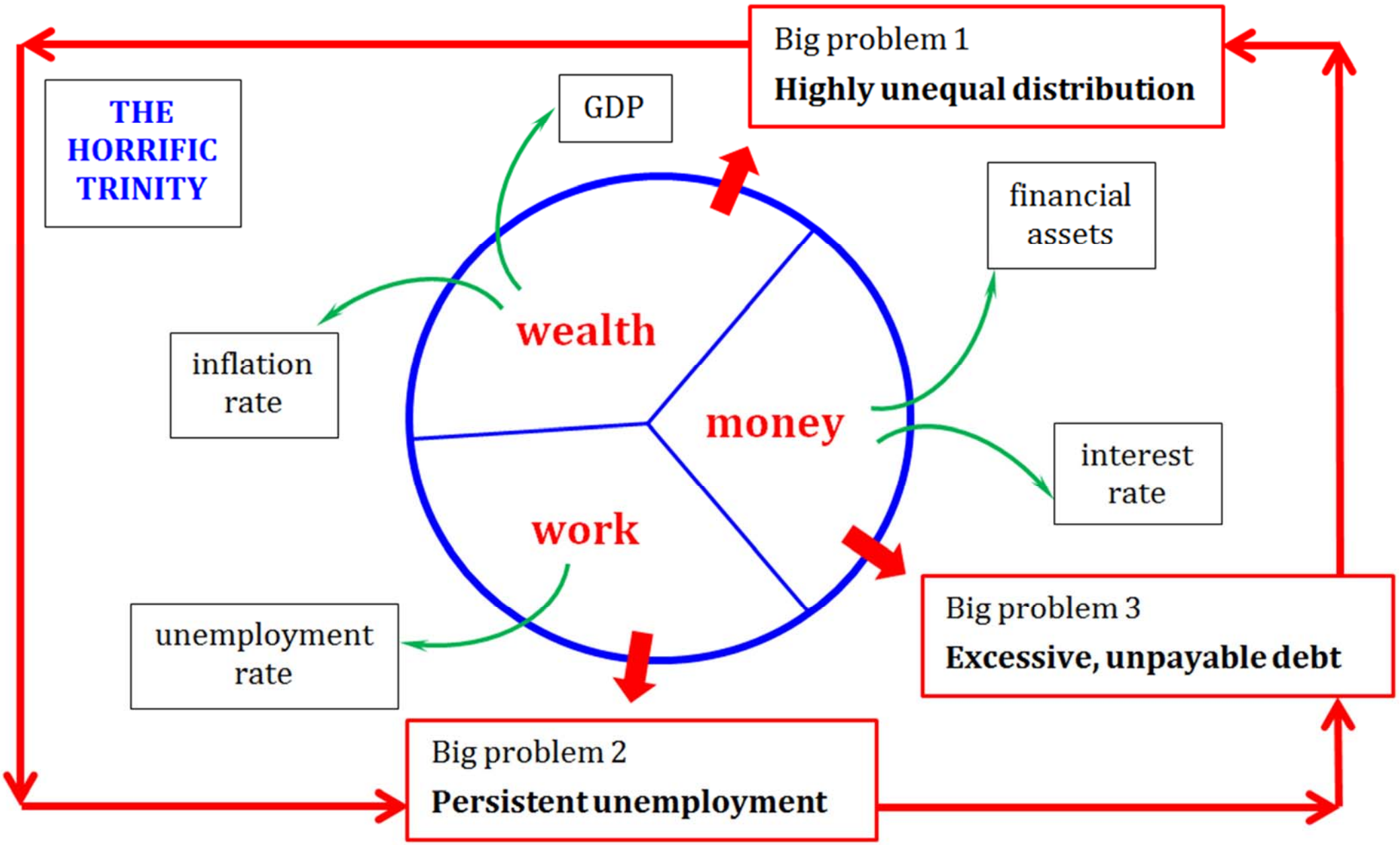

production
labour demand
employment
consump – tion
labour supply
expenditure (demand)
income

Interpreting the E-PIS model /2

- The classical view of this process attributes to the labour market the leading role. Employment is first established, this next determines production, and production is finally used.
- The Keynesian view inverts the order. First, expenditure decisions are made. These decisions indicate the necessary production level. Finally, the labour required to carry out the production plan is hired.
- The E-PIS model aligns itself with the second view. The state of the economy is foremost determined by the firms' expected level of aggregate demand.

Interpreting the E-PIS model /3

- To meet the expected demand level Y, firms hire the amount of labour N necessary to produce Y. As long as the income level corresponding to production level Y induces workers to supply at least N, the employment-income relation is irrelevant.
- Since there is no obvious reason why the EI relation cannot be established independently of the other relations, it is highly unlikely that workers will exactly supply N. Thus, the excess of labour supplied constitutes involuntary unemployment. As it emerges from the very working of the economy, it will be hard to eliminate it completely.


THE HORRIFIC TRINITY
Big problem 1
Highly unequal distribution
GDP
financial assets
inflation rate
wealth
money
interest rate
work
unemployment rate
Big problem 3
Excessive, unpayable debt
Big problem 2
Persistent unemployment