A framework for policy-making and two policy questions*

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In this presentation

1. Framework for primary balance and fiscal sustainability

- What determines primary balance (PB)?
- What does it take to keep PB=0 with ageing population?

2. Two policy questions

- How to deal with technology induced unemployment and displacement from work?
- How to improve work incentives in unemployment insurance?

What determines primary balance (PB)?

PB depends on

1. Cyclical conditions and hence on GDP growth

2. Employment rate because it determines how much working age population
   - pays taxes
   - receives benefits

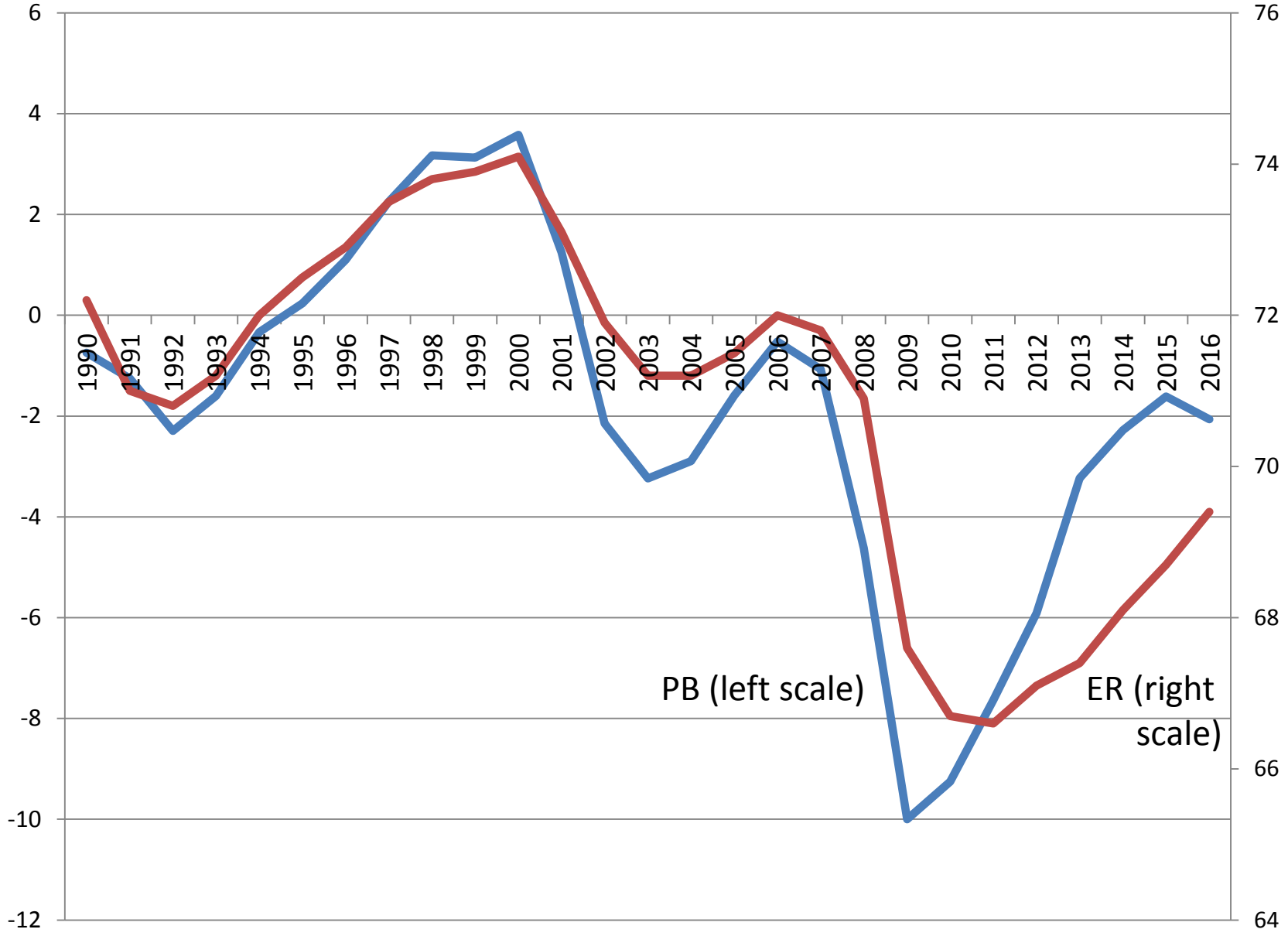
3. Fiscal policies

Under given fiscal policies and GDP trend growth, PB depends in the long-run on

- Employment rate = employed/working age population

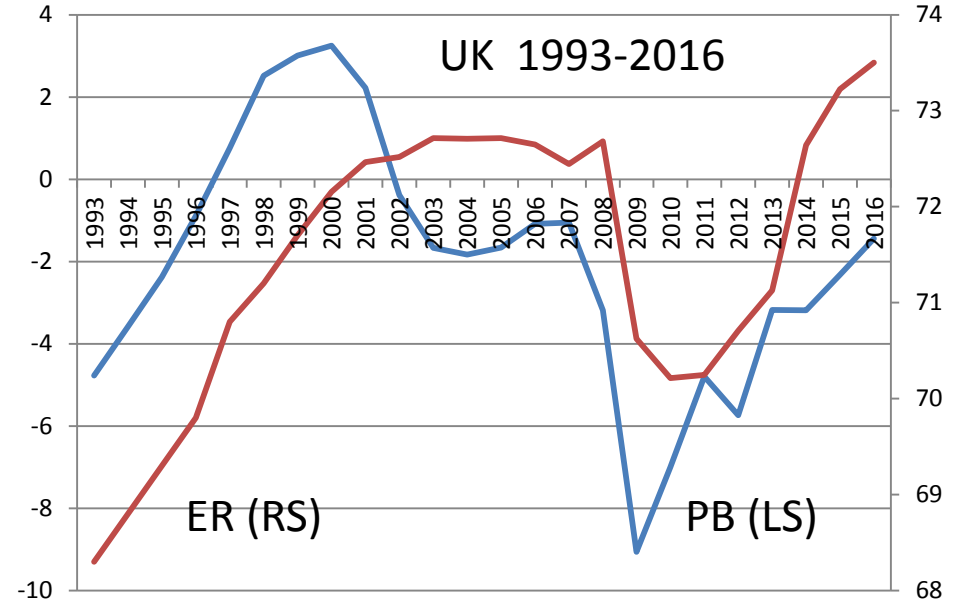
- Dependency ratio = (young +old)/working age population

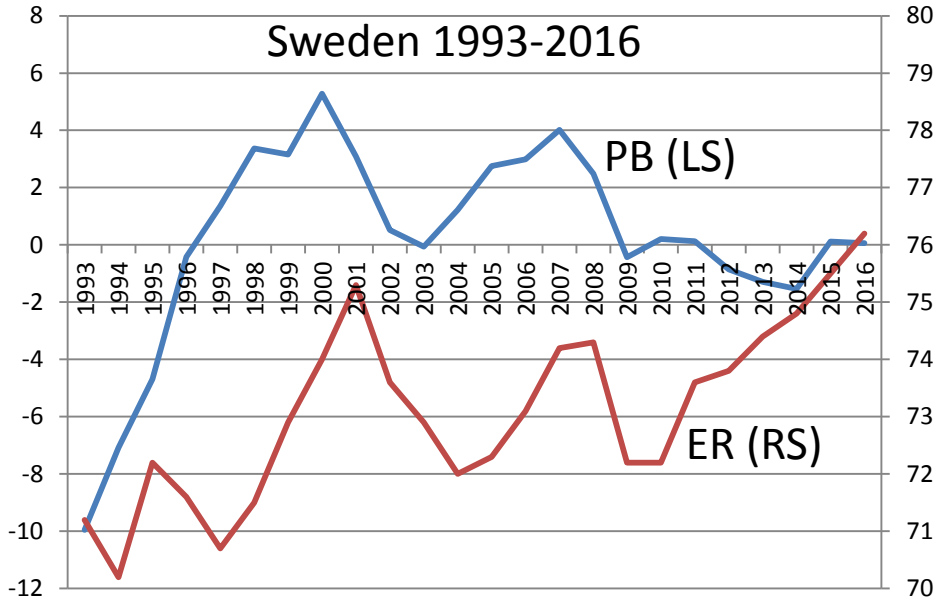
US primary balance (PB) and employment rate (ER), 1990-2016, %

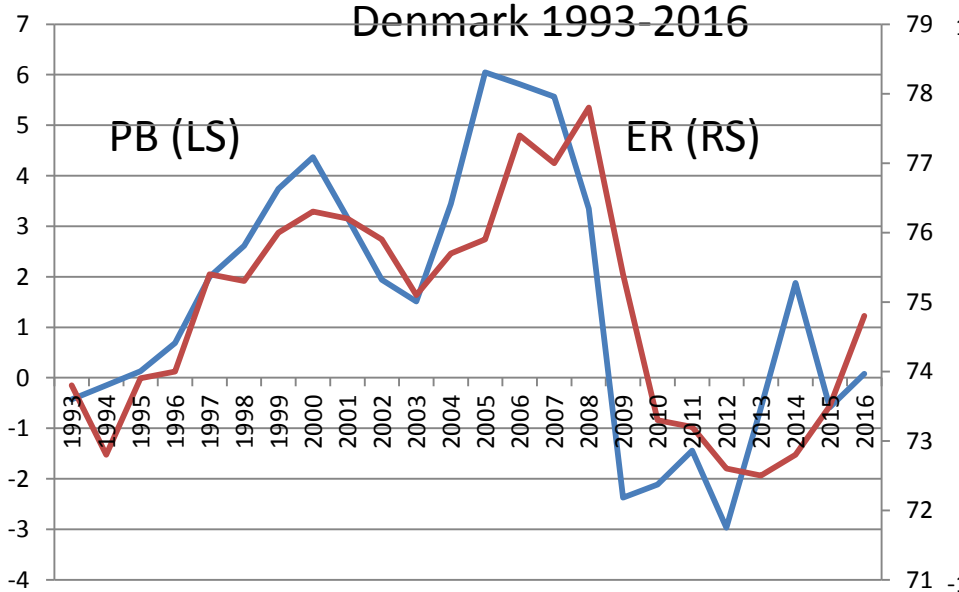


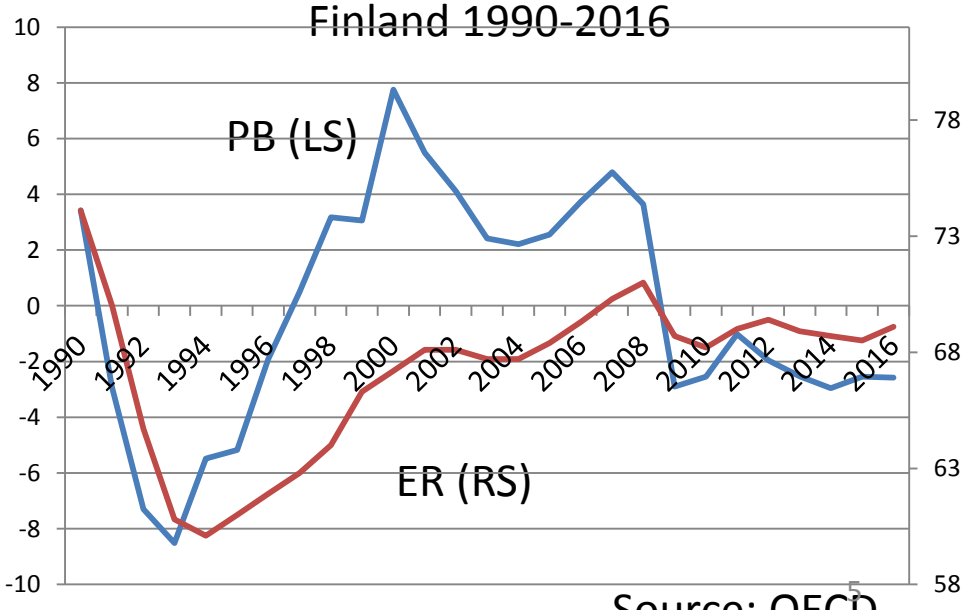
Source: OECD

Primary balance (PB) and employment rate (ER), %









Source: OECD

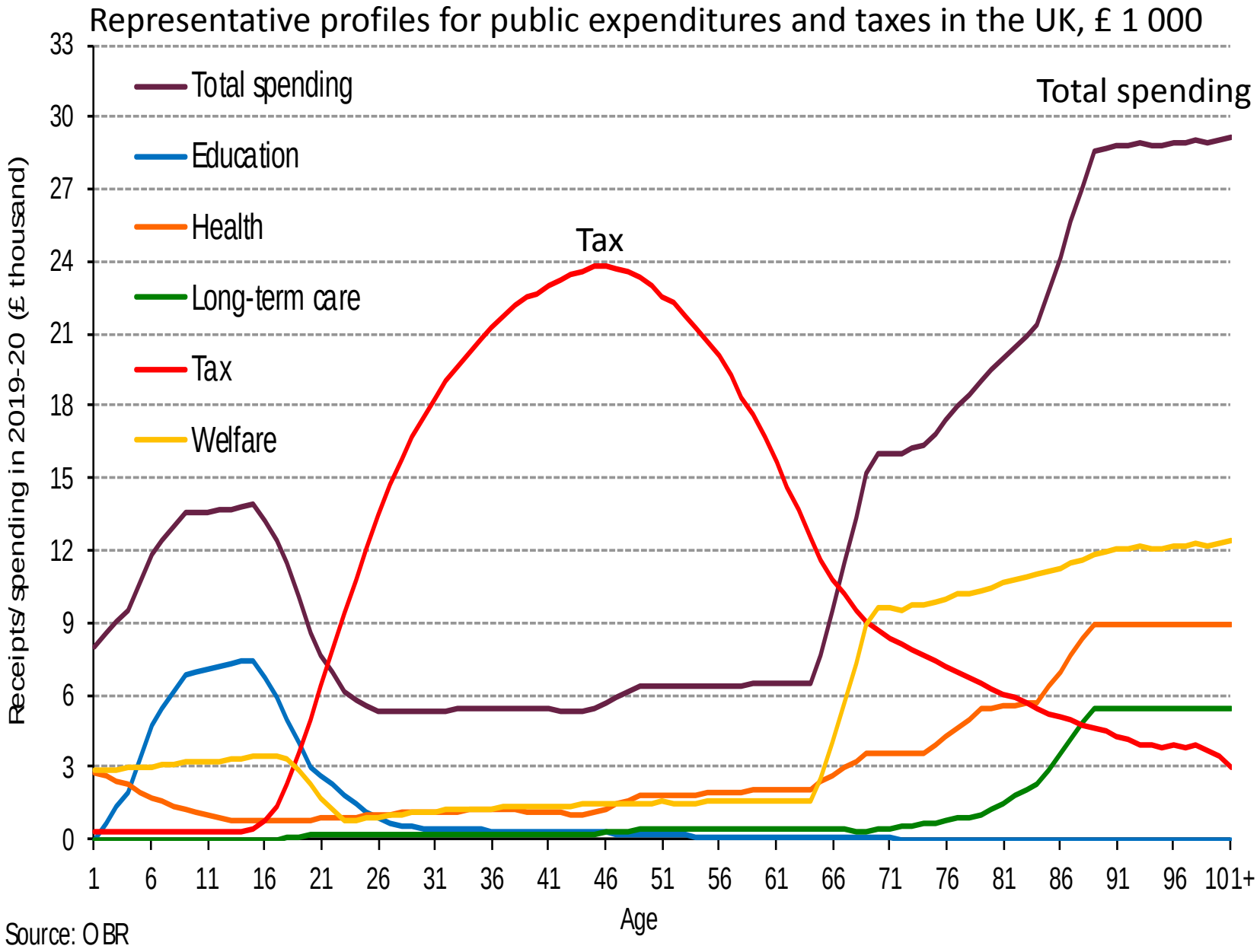
OLS regression of *PB = a + bEmployment rate + cGDP growth*

Dependent variable PB = general government primary balance/GDP, %

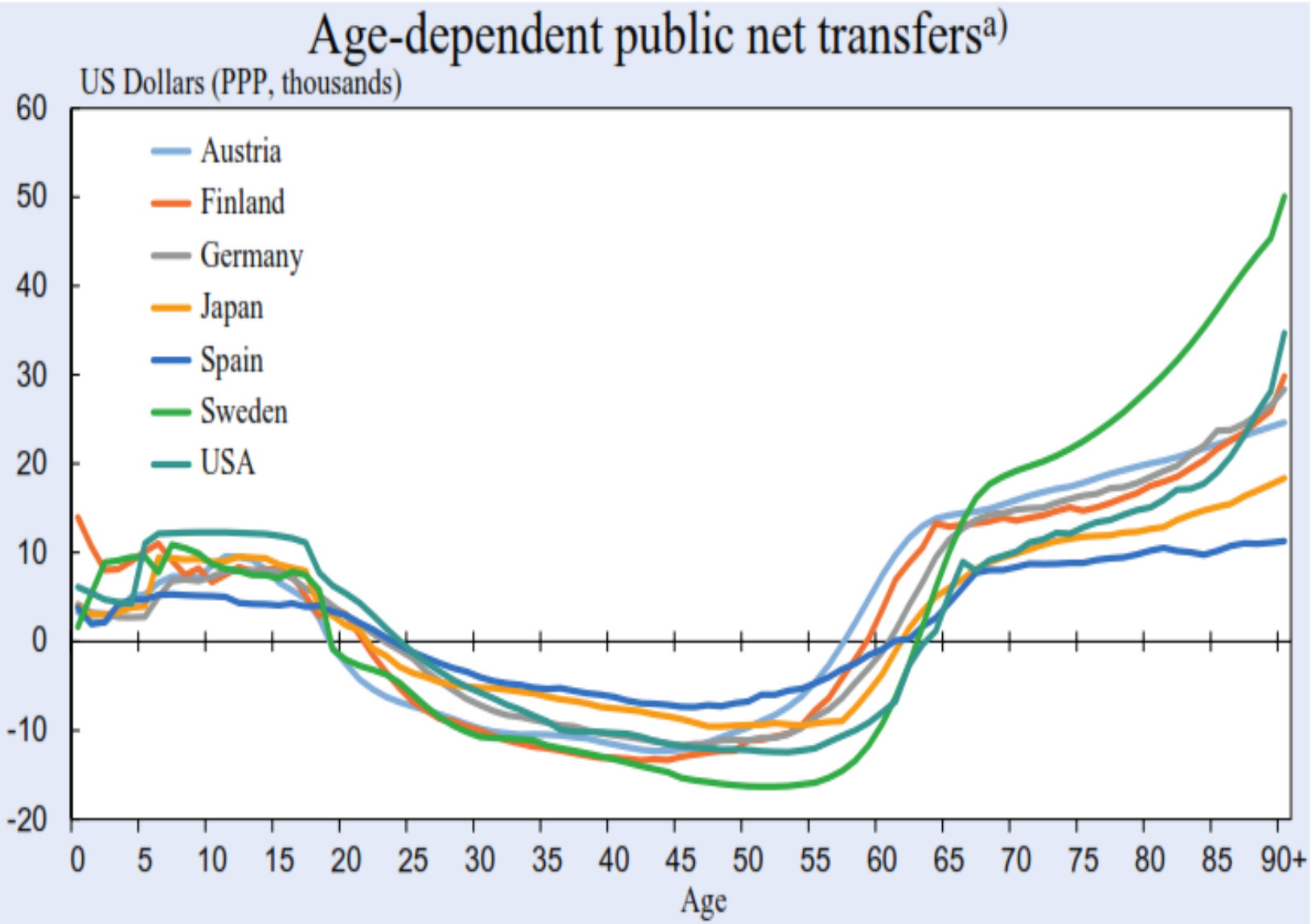
	US	UK	Denmark	Sweden	Finland
a constant	-81.14 (-7.8)	-56.6 (-2.6)	-100.4 (-8.3)	-59.7 (-1.9)	-55.1 (-5.1)
b Employment rate	1.10 (7.4)	0.73 (2.4)	1.35 (8.3)	0.81 (1.9)	0.80 (5.0)
c GDP growth	0.55 (2.6)	1.16 (4.3)	0.58 (4.4)	0.40 (1.9)	0.80 (5.0)
Adjusted R2	0.80	0.50	0.78	0.14	0.58
D-W	0.70	0.71	1.69	0.35	0.72
Estimation period Data source: OECD	1990-2016	1993-2016	1993-2016	1993-2016	1990-2016

Below coefficient estimates in brackets are their t-values. Low D-W values may result from omitted variables of which the most obvious one is discreationary fiscal policy.

Incorporating ageing populuation into the framework

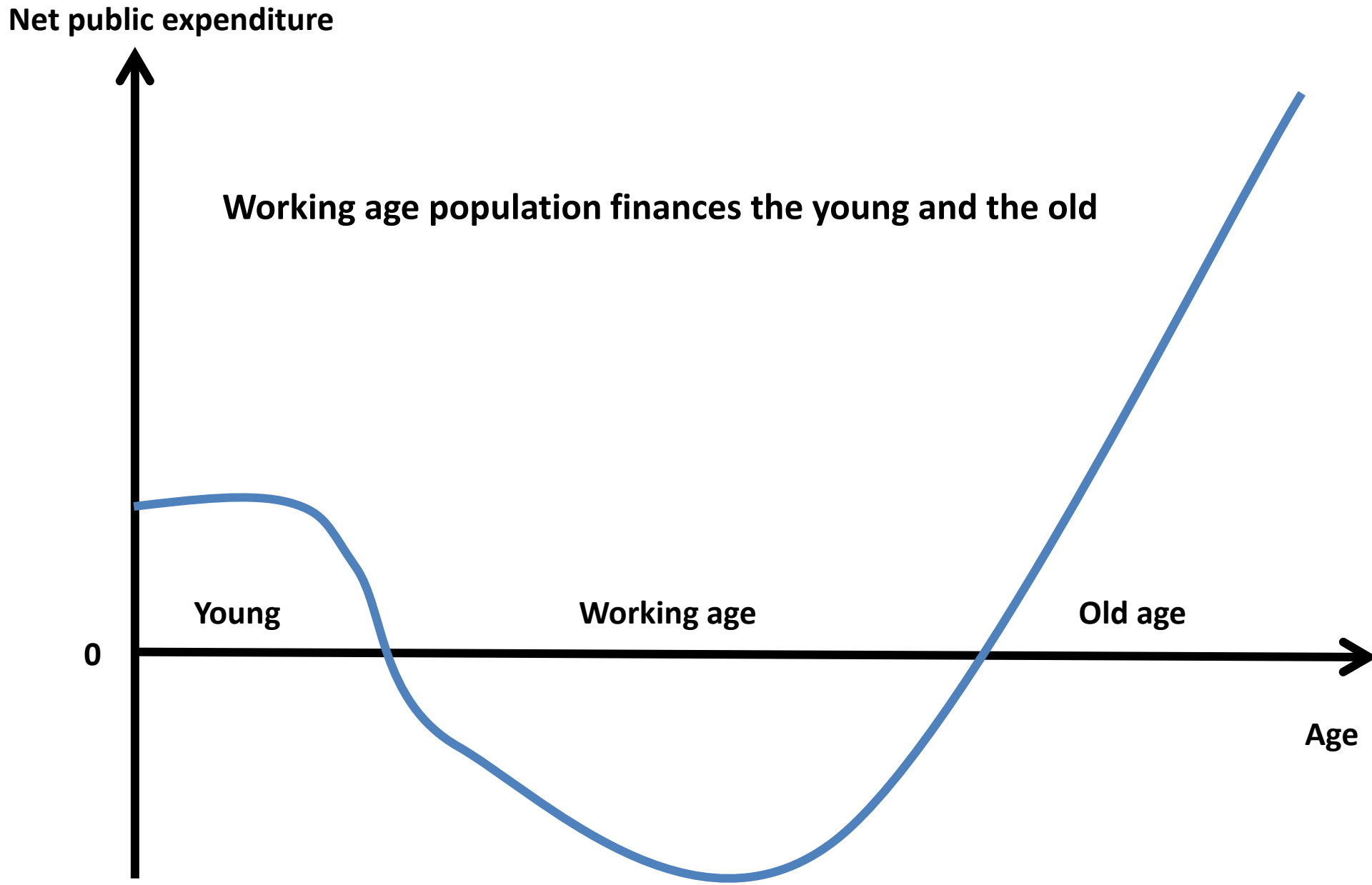


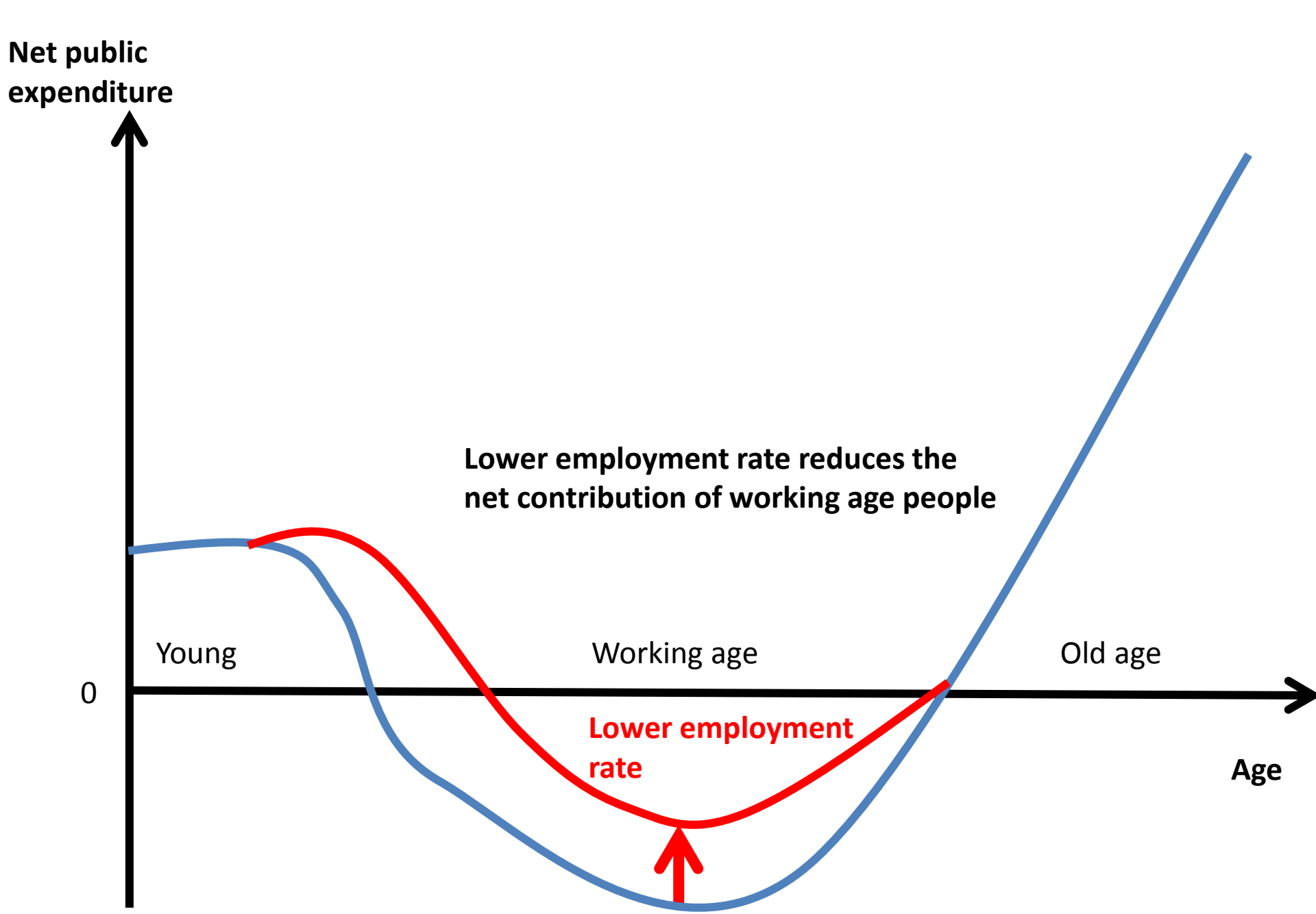
Source: OBR



Source: Andersen, Torben (2016), Intergenerational fairness. Bruegel-presentation & EEAG-report.
http://bruegel.org/wp-content/uploads/2016/02/Torben-Andersen-Economic-Weakness-and-Demographic-Challenges-Bruegel-Presentation.pdf

Lähde: Andersen, Torben M., Giuseppe Bertola, John Driffill, Harold James, Hans-Werner Sinn, Jan-Egbert Sturm and Branko Uroševic, "Chapter 2: Intergenerational Fairness", *EEAG Report on the European Economy 2016*, 2016, 54-69
https://www.cesifo-group.de/ifoHome/publications/docbase/details.html?docId=19189725


Net public expenditure
Working age population finances the young and the old
Young
Working age
Old age
0
Age


Net public expenditure
Lower employment rate reduces the net contribution of working age people
Young
Working age
Old age
0
Lower employment rate
Age

Public finances sustainable if public sector primary balance PB = 0*

Appendix A derives the required employment rate ER* that keeps PB = 0.

ER* can be written as

ER* = a(DR+1), where a is a constant and DR = Dependency Ratio

DR = (young + old)/working age population

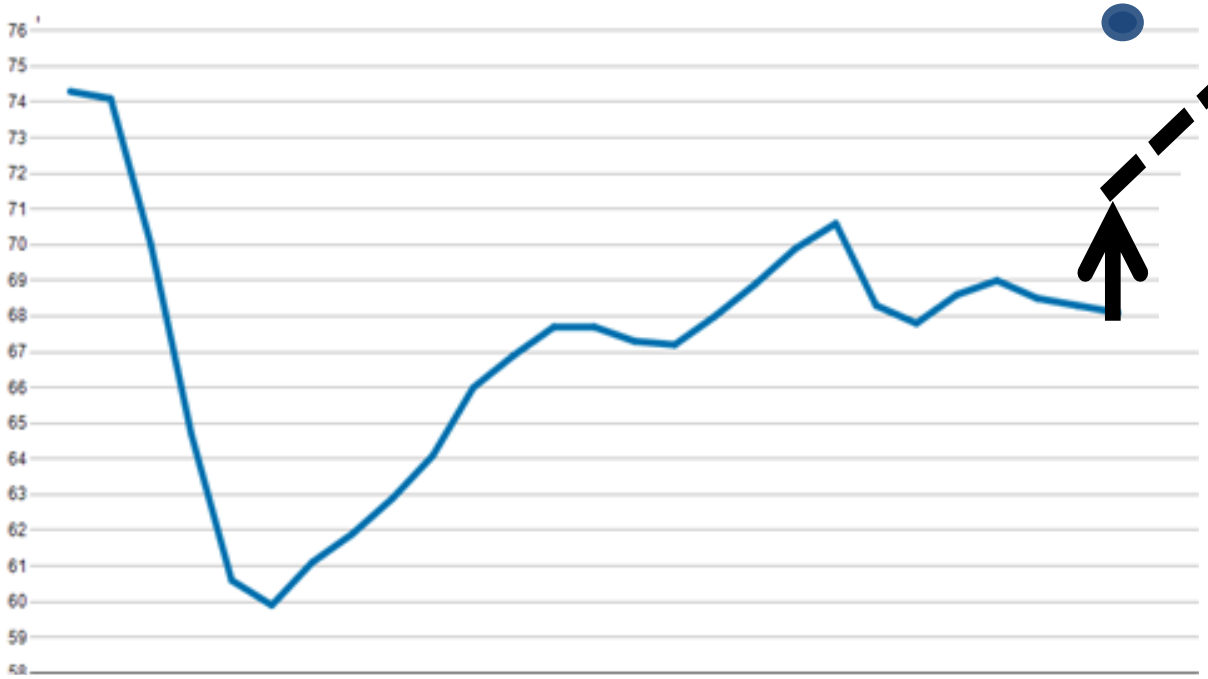
*PB=0 may not ensure sustainability depending on the interest rate growth difference and level of debt.

Finland's required employment rate to keep primary balance PB = 0

Iceland's employment rate in 86½ % in 2016

Sweden's employment rate 76 % in 2016

app. 80 % in 2030



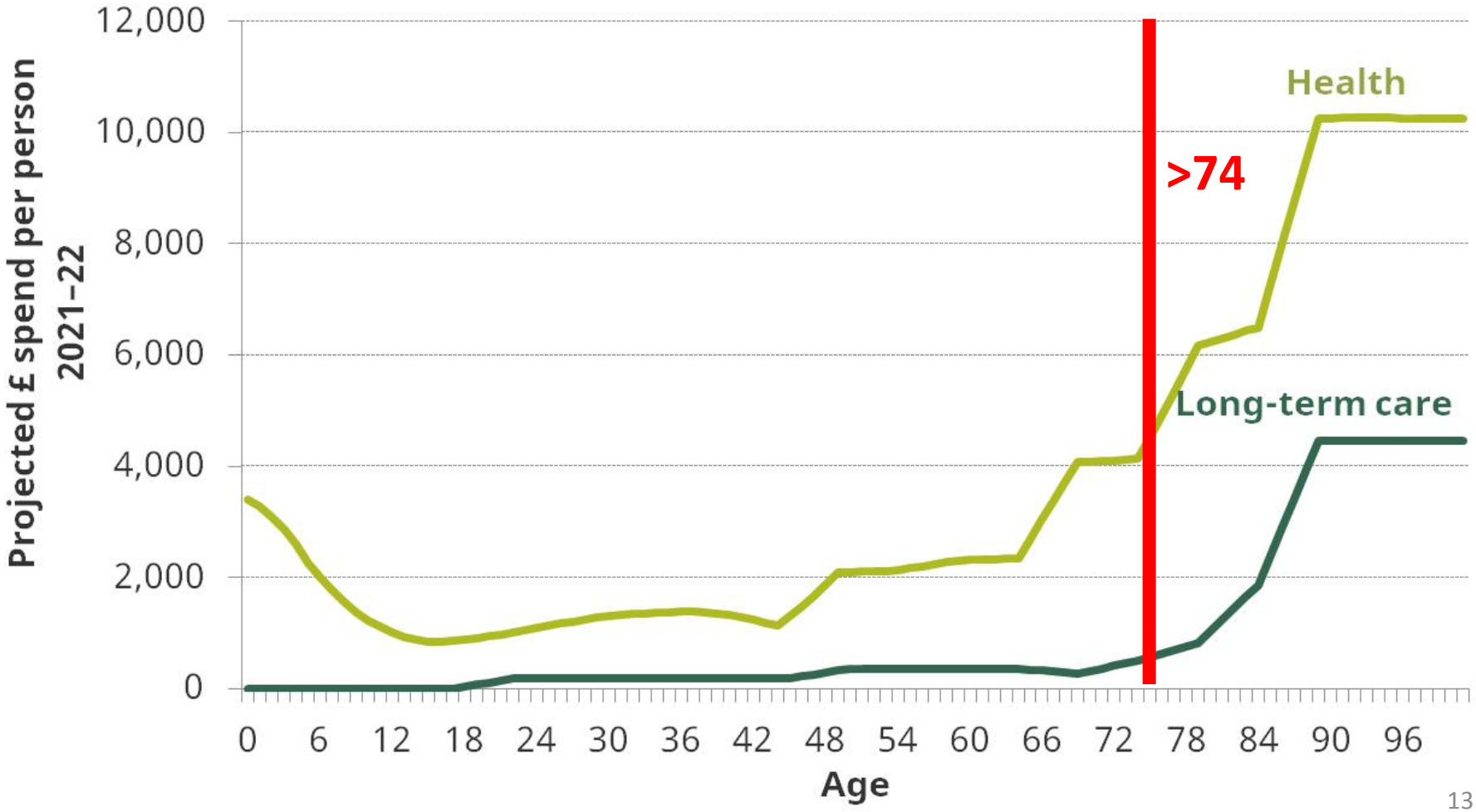
Year

Source: Statistics Finland and own calculations

Why the rquired employment rate ER* increases so much in 2020s (to about 80 % in 2030)?

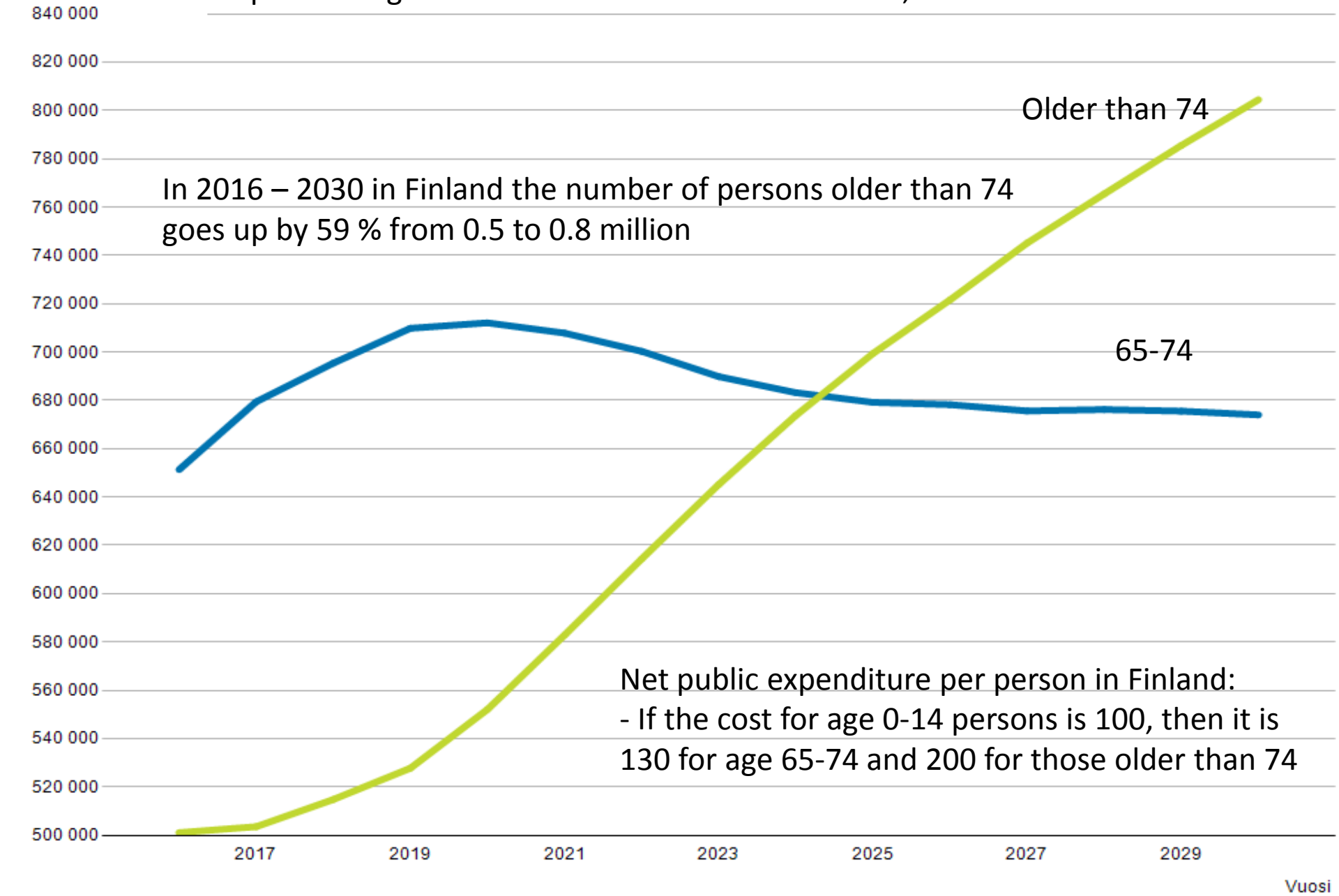
1. Because health care costs per person rise rapidly after about 74 years of age and
2. Because the 74+ population increases rapidly in the 2020s (large baby boom generation)

Age profiles of spending on health and long-term care in the UK



Source: Office for Budget Responsibility, Fiscal Sustainability Report 2017, Chart 3.7.

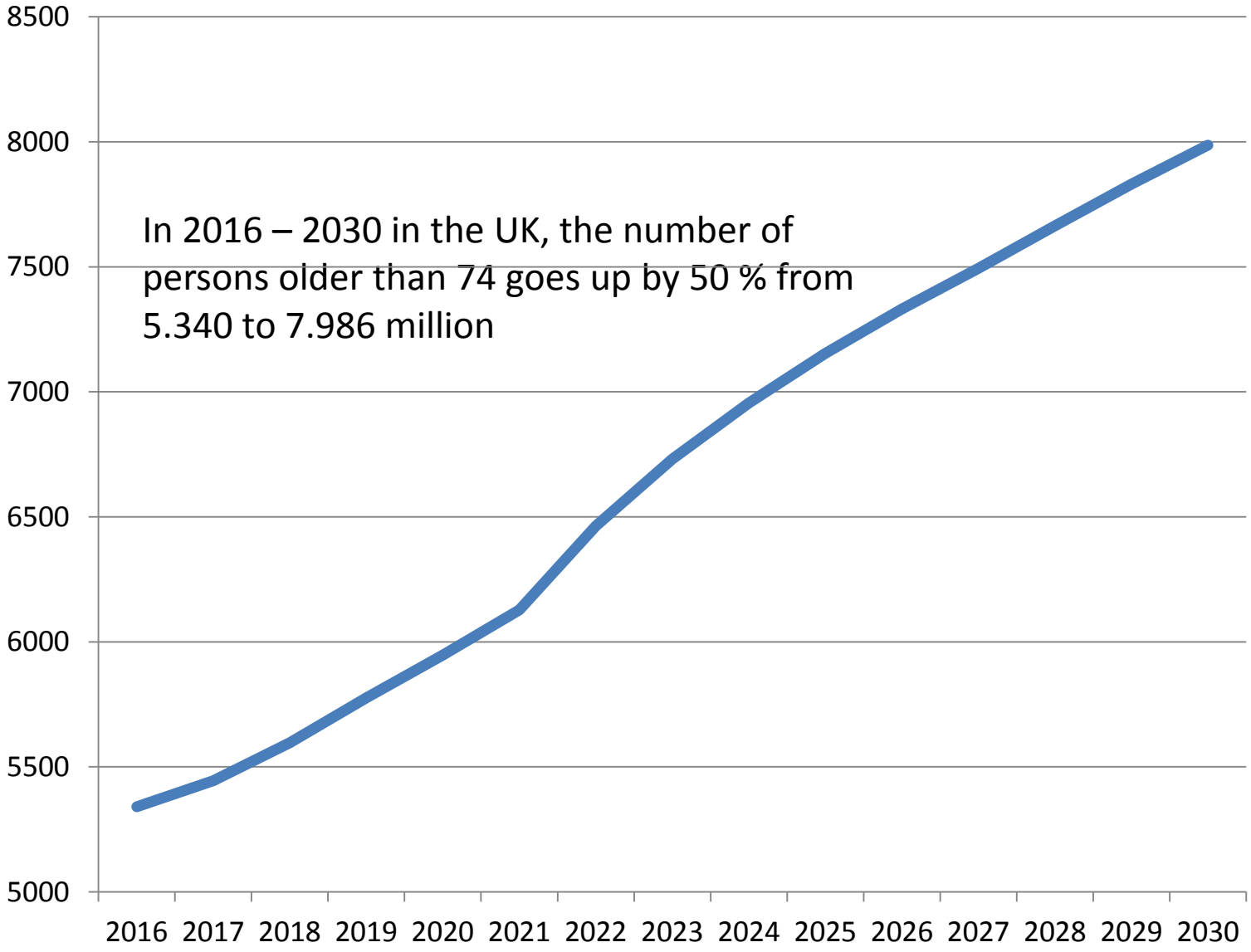
Population age 65-74 and older than 74 in Finland, 2016 – 2030



Source: Statistics Finland, Population forecast

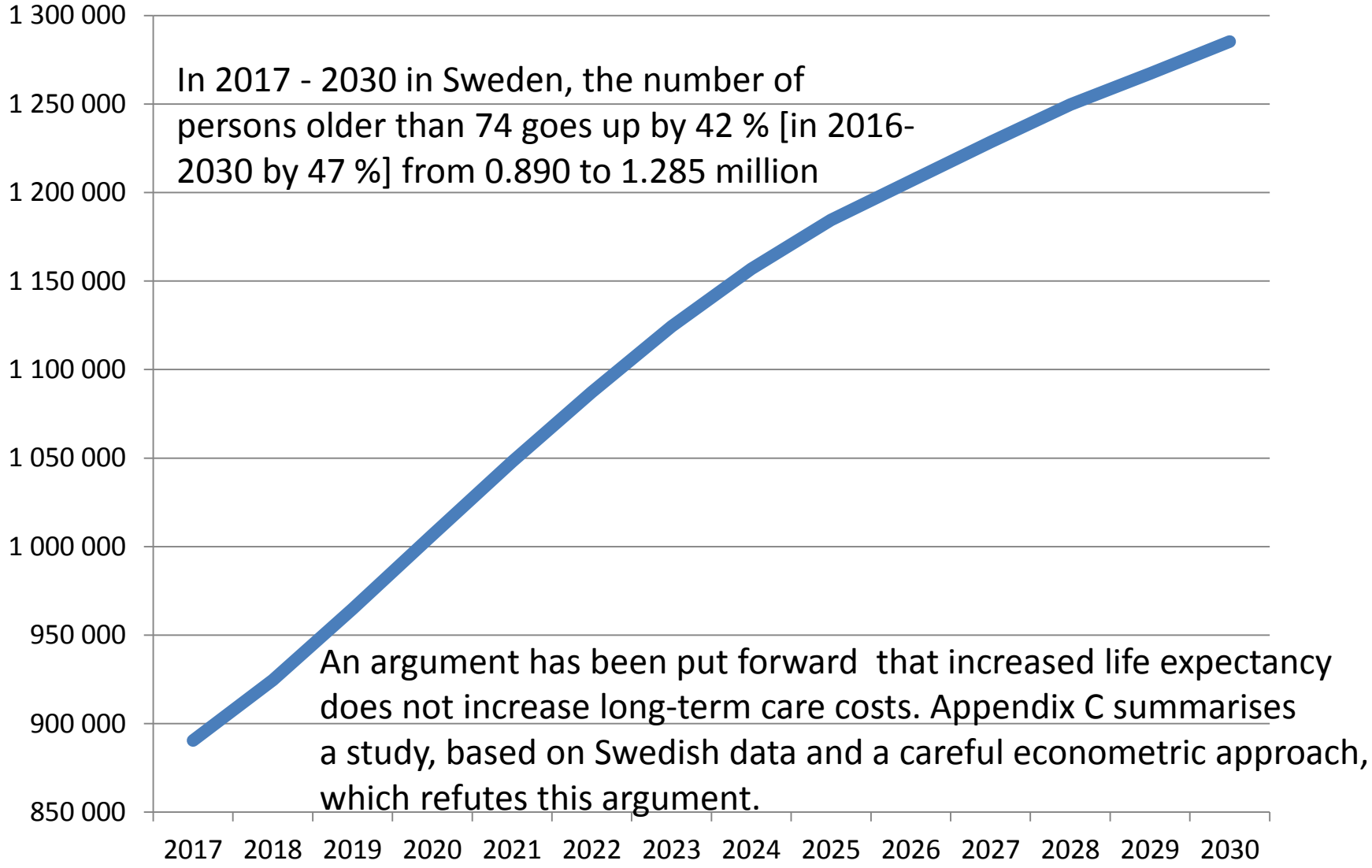
Lähde: Tilastokeskus

Population age older than 74 in the UK, 2016 – 2030, 1 000 persons



Source: ONS

Population age older than 74 in Sweden, 2017 – 2030



Source: Statistics Sweden

The framework in sum and its policy implications

The derived framework is based on

- Empirical relation between primary balance PB and employment rate ER
- Deriving employment rate ER* at which PB=0 in terms of dependency ratio DR
- Data on net public expenditure/person in dependent age groups and population forecast

The framework is based on a number of simplyfying assumptions which make it very tractable. It establishes a direct link between employment rate and fiscal sustainablity.

The framework enables consistent welfare analysis of structural policies when it is assumed that society has a preference to retain roughly the current level public services and benefits.

Given the costs of ageing, the framework stresses the need for employment boosting policies

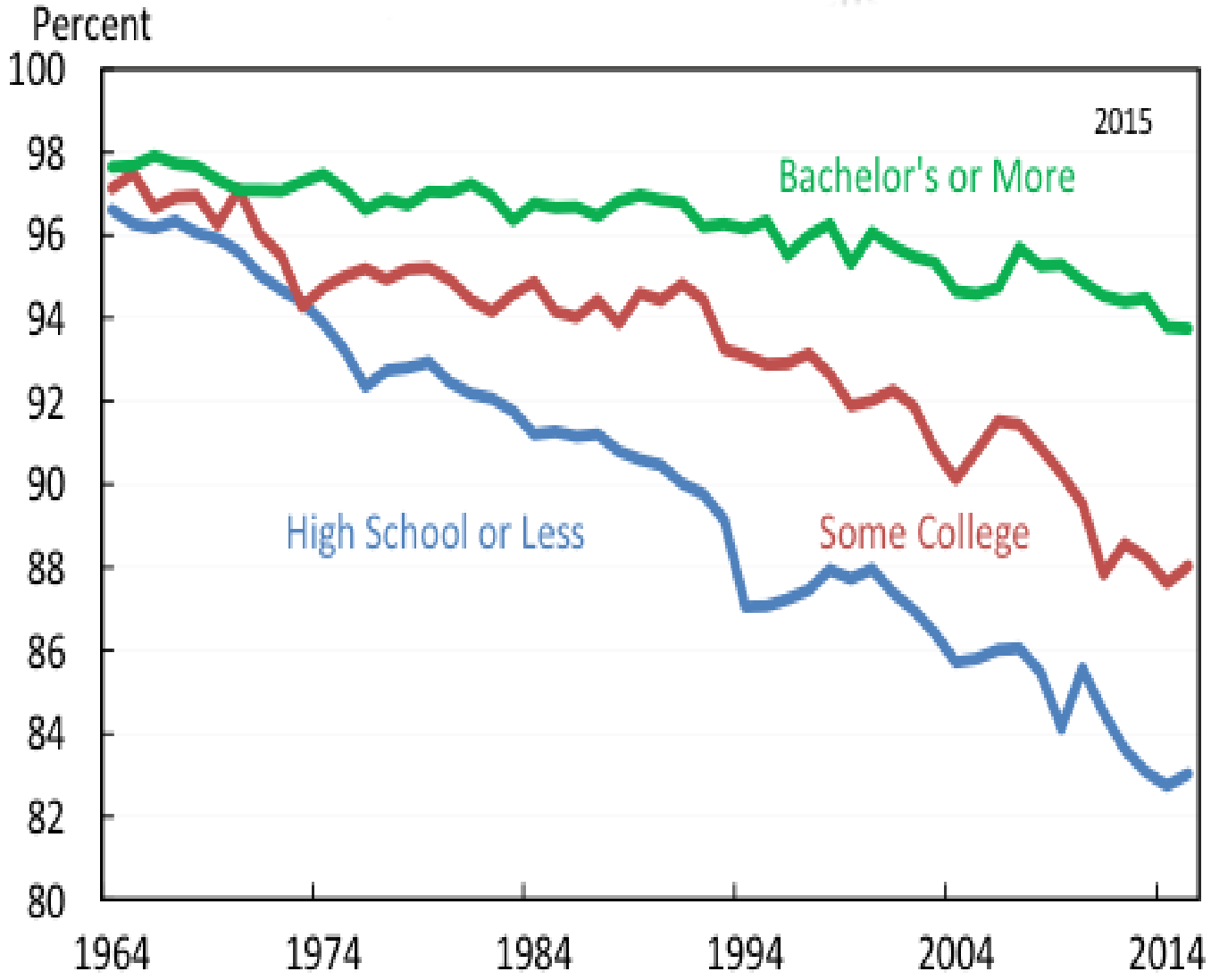
- E.g. one should set ER target for age 15-74, not anymore for age 15-64

In general, the framework stresses the importance of

- Policies affecting work incentives
- Changes in the economic environment that may affect work incentives

The rest of the presentation focuses on two policy questions and changes in the economic environment which may have affected work incentives

Prime-age male labour force participation by educational attainment in United States



Source: Bureau of Labor Statistics, Current Population Survey (Annual Social and Economic Supplement); CEA calculations.

How to deal with technology induced unemployment and displacement from work?

Work does not end (unlimited service demand; e.g. welfare and ”artisan” services)

- but it pays less than before for many whose old work gets done more by AI

One policy option

- Unversal basic or participatory income schemes (paid non-work in third sector)
- But entry probability from third sector activities into open labour markets very low

Hence reducing work incentives further by paid non-work would lower ER and require

- cuts in public expenditures to keep PB=0

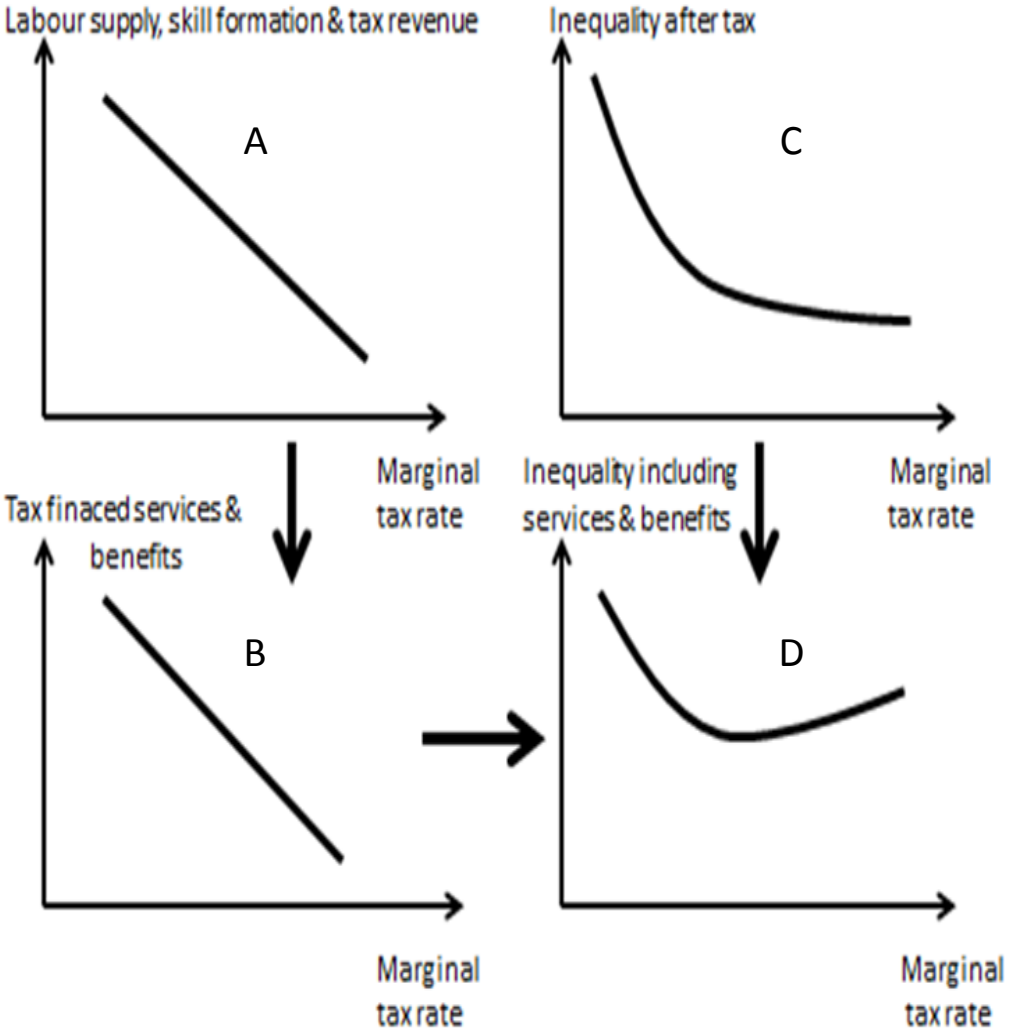
A better policy option if society wants to keep current level public services and benefits

- Improve work incentives
- Make work pay, but there are limits to subsidies for low-paid work

$\Rightarrow$ Make also human capital pay by cutting marginal taxes

- But what about income inequality if one cuts marginal tax rates?

The effect of marginal tax rate on income inequality



A. Higher marginal tax rate reduces labour supply, skill formation & tax revenue

B. Reduced tax revenue reduces services & benefits

C. Without behaviourial effects higher marginal tax rate reduces inequality

D=B+C at some point, a higher marginal tax rate may start to reduce tax revenue. This reduces services and benefits. This, in turn, may increase income inequality more than a higher marginal tax rate reduces it.

E. (not in graph) When higher marginal tax rate reduces skill formation, the shortage of skilled workers increases. This increases their wages and income inequality.

When Heatcote et al (QJE, forthcoming) take effects A, B, C, and E into account, and assuming that poverty constrains human capital investment, the US tax progression is close to optimal in their analysis.
http://www.jonathanheathcote.com/hsv_taxation_final.pdf

Weaker work incentives if the value of leisure has increased and its price has decreased

The effect of higher value and lower cost of leisure time on labour supply

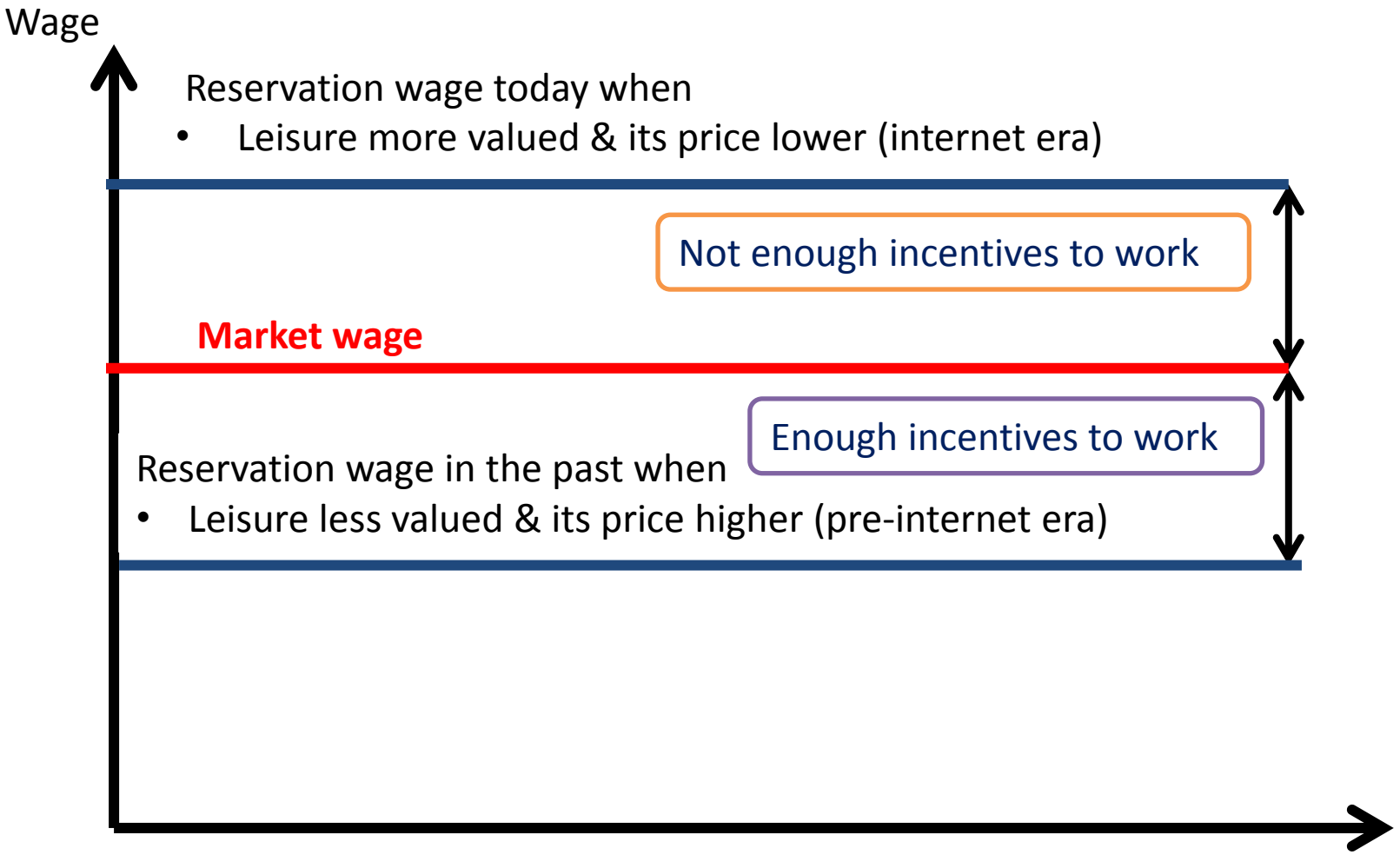
Aguiar, M. et al (2017) http://scholar.princeton.edu/sites/default/files/maguiar/files/leisure-luxuries-labor-june-2017.pdf
Hurst, E. (2016) http://review.chicagobooth.edu/economics/2016/article/video-killed-radio-star
Krueger, A.B. (2016) https://www.bostonfed.org/-/media/Documents/economic/conf/great-recovery-2016/Alan-B-Krueger.pdf

- Games and internet including social media have increased the value of leisure time
- In 2014 in the US, average young, lower-skilled, non-employed man spent about 2 hrs/day on games
- The innovations and new services are both cheap in relative terms, and fun
- It is now more attractive to take leisure; Aguiar et al (2017):
- This accounts for much of the fall in labour input of young men in the US in the past 15 years

In addition, with the increased use of free digital services

- CPI has overestimated inflation => the real value of CPI-indexed benefits have increased
- Has not increased benefits/wages, but has made living with benefits easier

Internet (games, social media etc.) → higher quality but lower cost leisure time



⇒ Stresses the need to improve work incentives

How to improve work incentives of unemployment insurance?

- Difficult given unavoidable trade-offs

E.g. Andersen, Torben M. (2016), Incentives versus insurance in the design of tax-financed unemployment insurance. International Journal of Economic Theory, Vol. 12, No. 2, 2016, p. 127-150.
https://voxeu.org/sites/default/files/file/DP8025.pdf

Unemployment benefit level

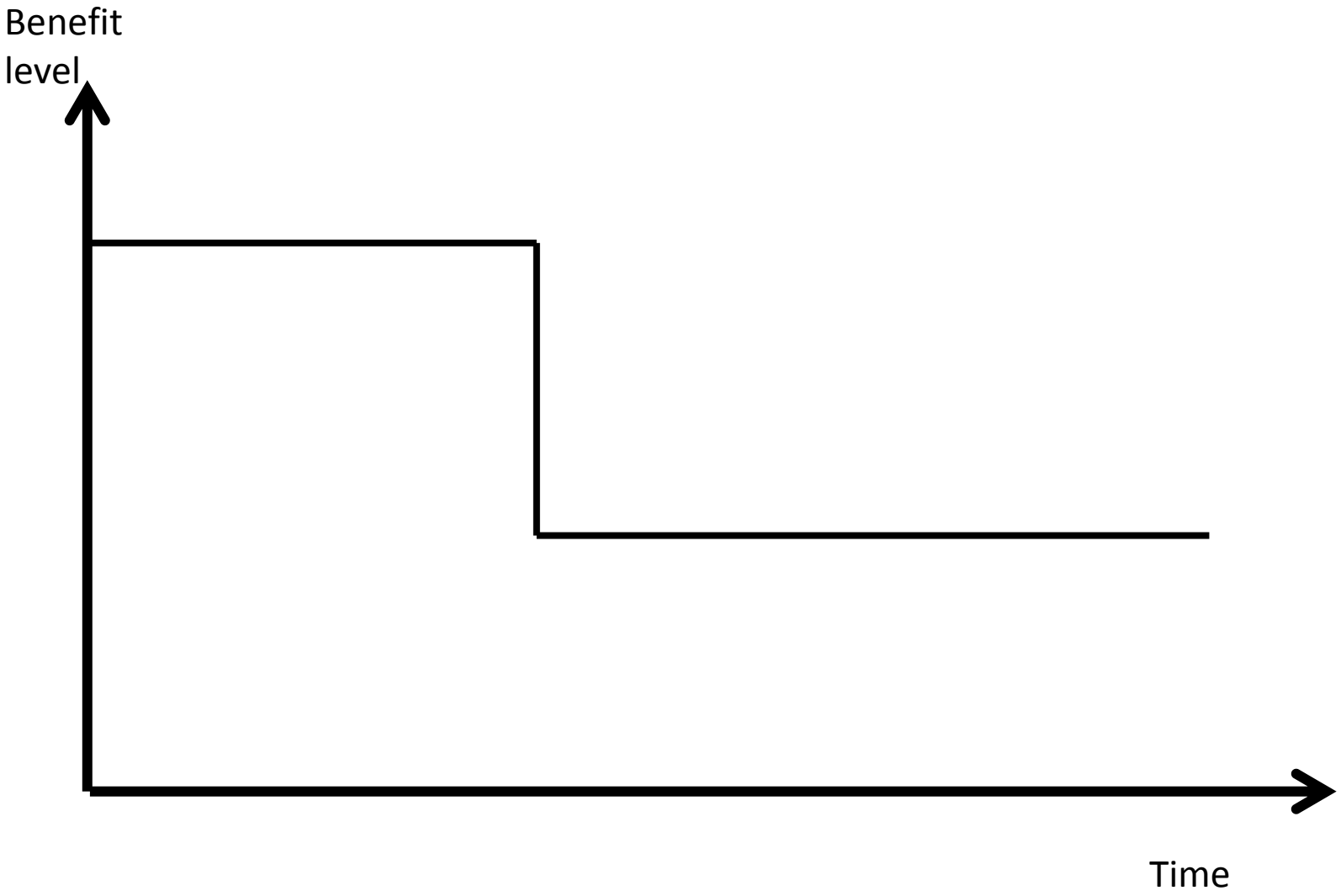
- High benefit = Good insurance, bad work incentives
- Low benefit = Bad insurance, good work incentives

Benefit duration

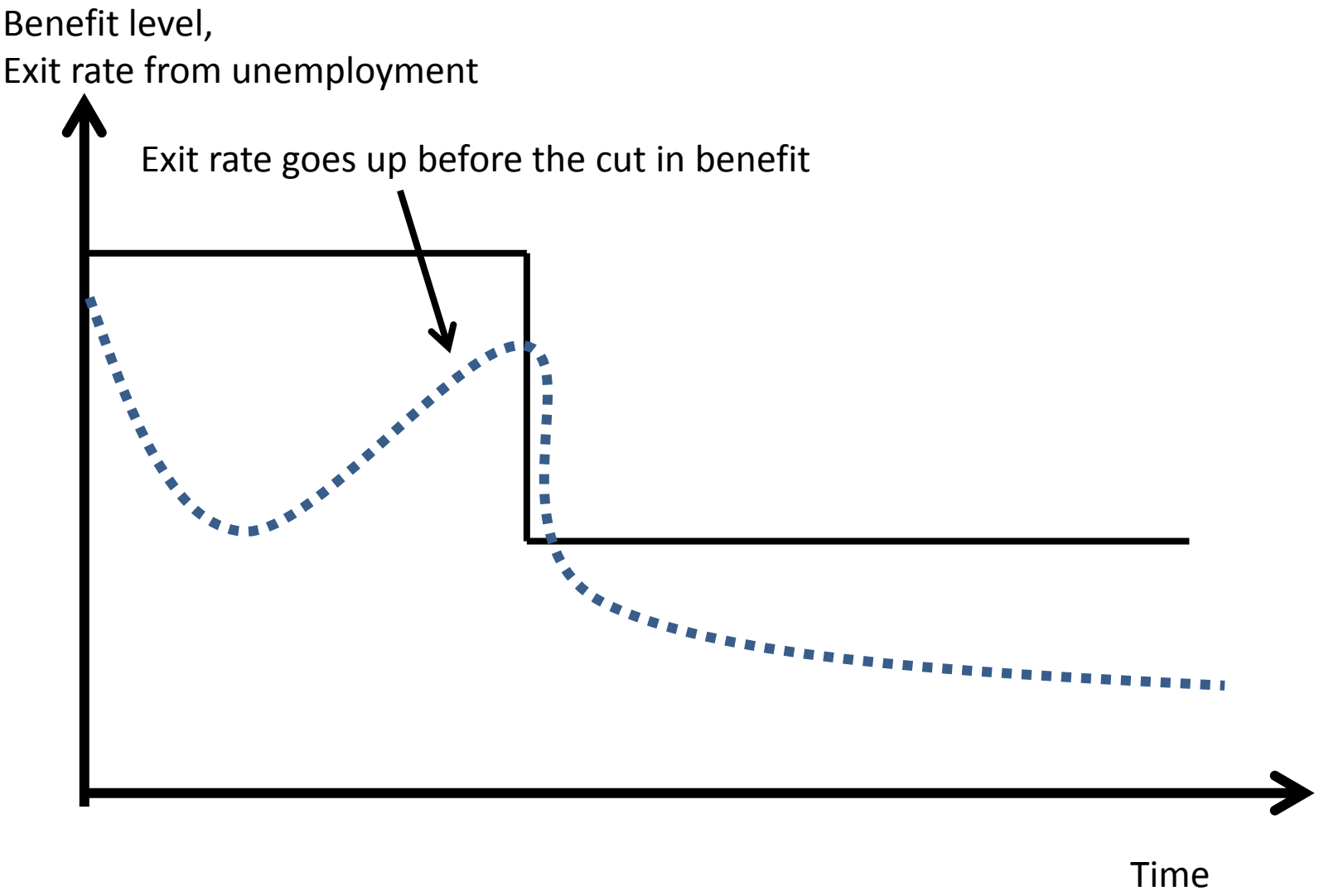
- Short benefit = Good work incentives, not enough time to search for a good job
- Long benefit = Bad work incentives, enough time to search for a good job

E.g. Acemoglu, Daron & Shimer, Robert (1999), Efficient Unemployment Insurance. Journal of Political Economy, 107, pp. 893-928. http://economics.mit.edu/files/3907

Traditional way to shorten unmployment duration

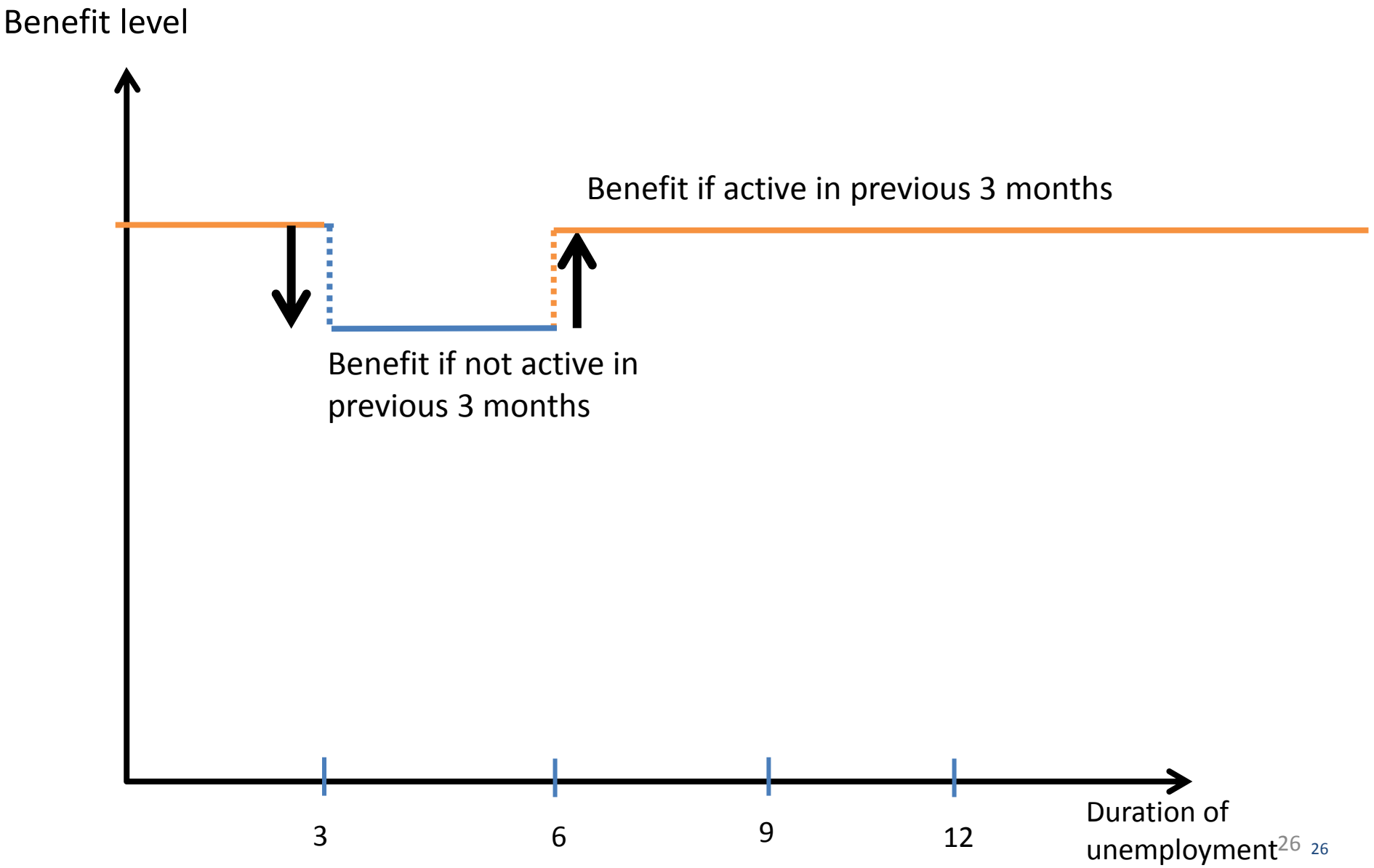


Traditional way to shorten unemployment duration



The reform

- If an unemployed person does not work enough or participate in ALP, a cut in benefit



The reform

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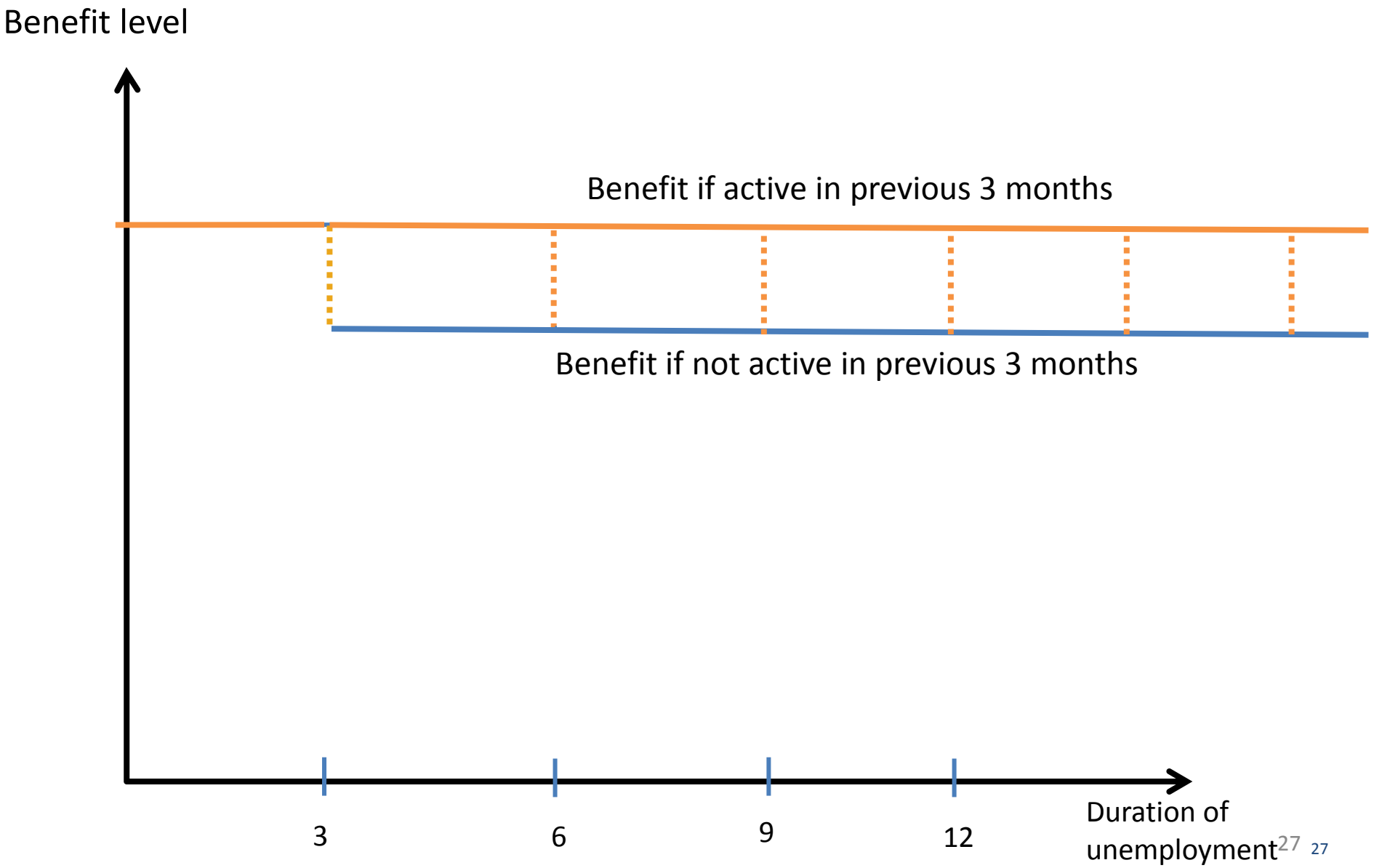
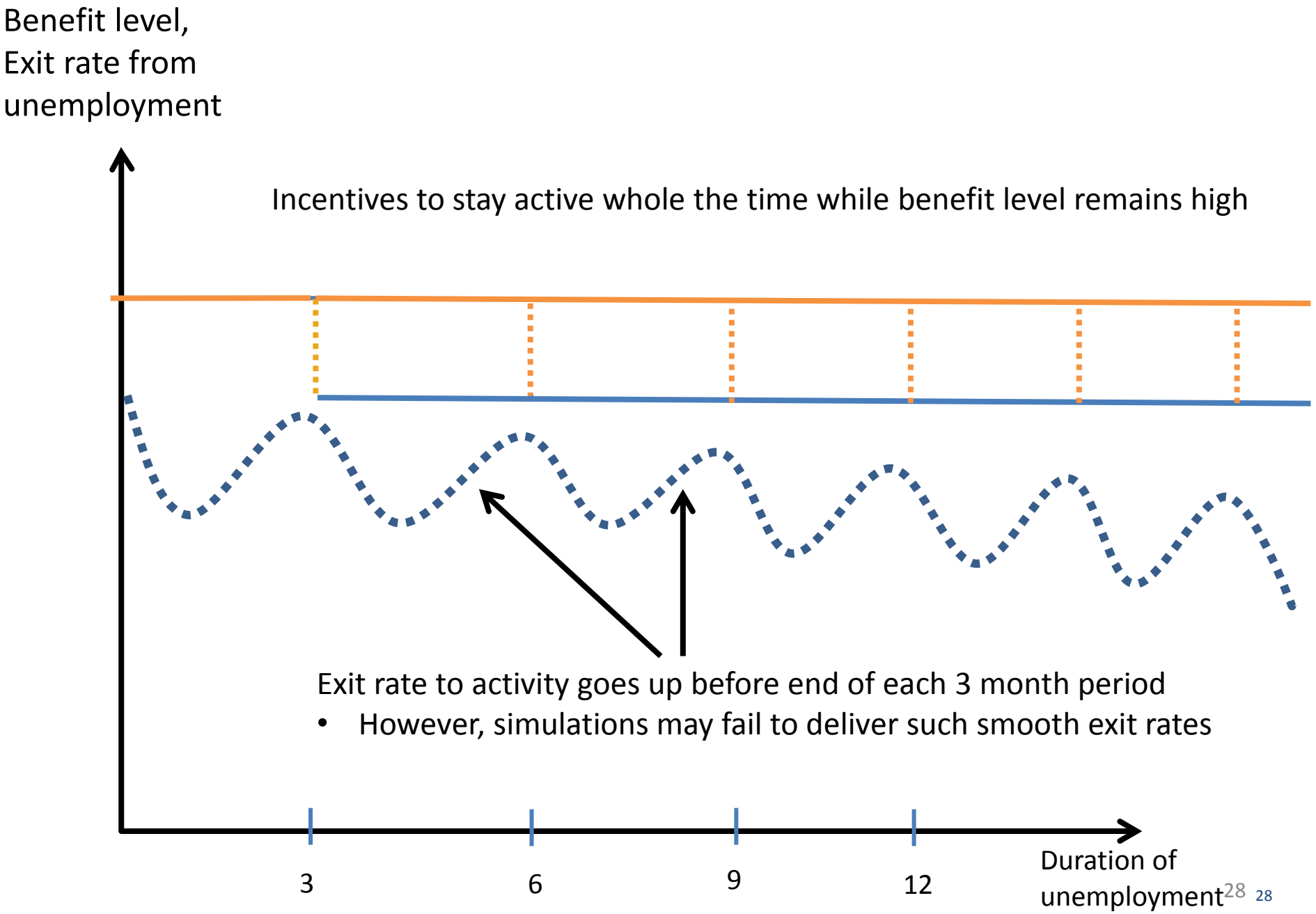



Benefit level,
Exit rate from
unemployment
Incentives to stay active whole the time while benefit level remains high
Exit rate to activity goes up before end of each 3 month period
• However, simulations may fail to deliver such smooth exit rates
3
6
9
12
Duration of
unemployment

Concluding remarks

Primary balance PB depends critically on employment rate ER

- Fiscal sustainability requires high enough ER* with which PB=0
- ER* increases with ageing costs

In the coming years ER* goes up rapidly given that

a) The average net public expenditure for a 74+ person is very high
b) In 2016-2030 the 74+ population grows fast (e.g. 59 % in Finland and 50 % in the UK)

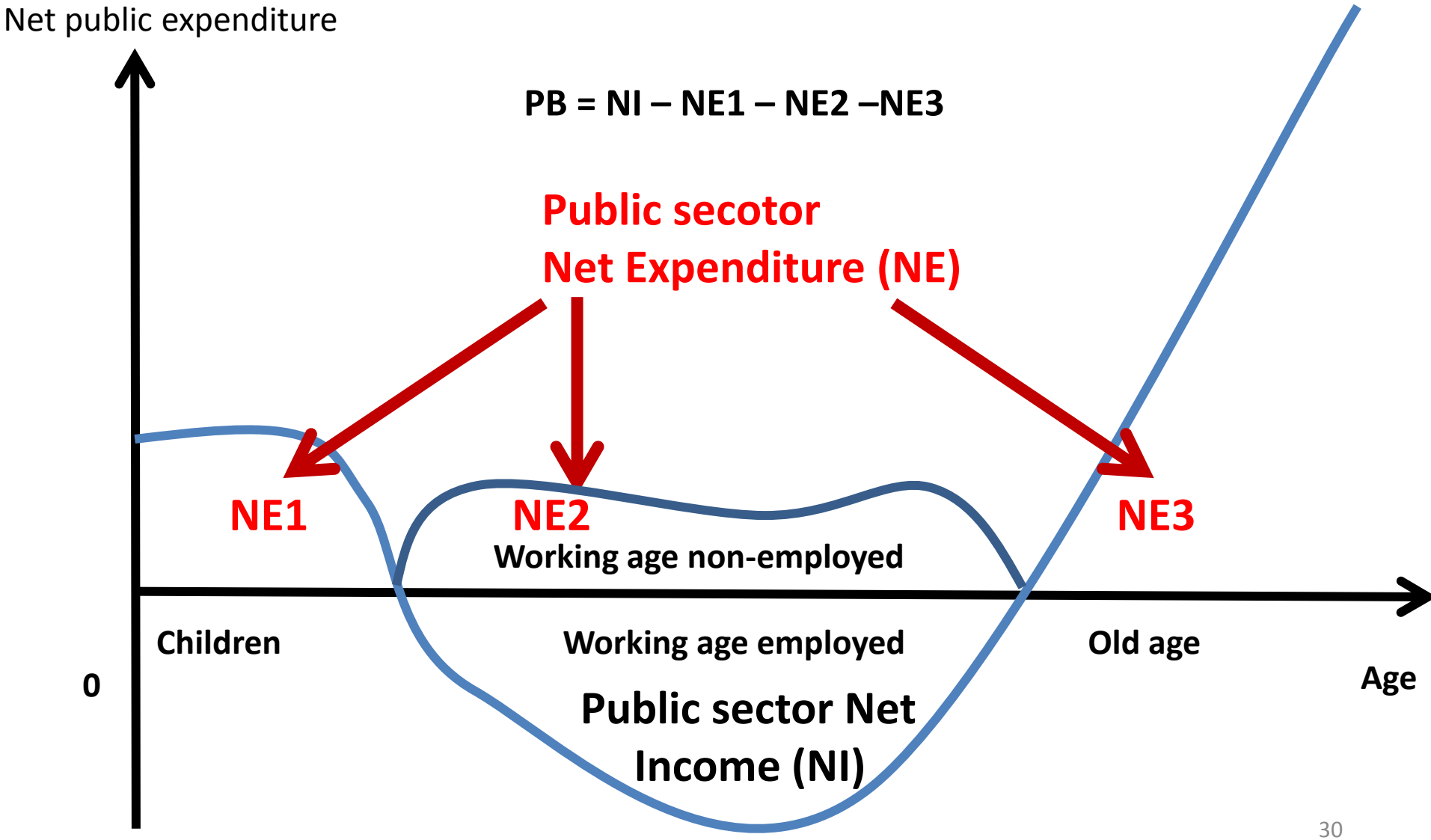
A need to increase work incentives if technology (e.g. AI) reduces market wages for many

- Make work and human capital pay enough
- Reform unemloyment insurance to provide incentives to take up a job at every stage

Reducing work incentives further by paid non-work (e.g. participatory income) would

- induce exit from labour markets, lower ER & lead to public expenditure cuts to keep PB=0

Appendix A: Defining required employment rate at which PB=0 given dependency ratio



Total net expenditure NE = NE1 + NE2 + NE3. NE can be written as

(1) NE= c(D+NL), D = population <15 years + >64 years, NL=non employed working age population, c =constant.

Abstracting from capital and assuming fixed working hours per worker, GDP can be written as GDP = aL, where L = labour input. Using this, NI can be written as

(2) NI = fGDP = hL, h=fa, f= net tax ratio of the employed, where h and f are constant.

Dependency ratio is of the form

(3) DR = D/(NL+L)

Employment rate is of the form

(4) ER = L/(L+NL)

Using (4) and L=ER(L+NL), (2) can be written as

(5) NI = hER(L + NL)

Using (3) and D = DR(L+NL), (1) can be written as

(6) NE = c(DR(NL+L) + NL)

Using (5), (6) and PB =NI-NE, PB can be written as

(7) PB = hER(L+NL) - c(DR(L+NL) + NL)

Defining the required employment rate ER* as the employment rate under which the primary balance balances and settting PB = 0 in (7), dividing the equation by (L+NL) and noting that NL/(L+NL)= 1-ER, one obtains

(8) hER* - c(DR+1-ER*)= 0. Noting k=h/c, (8) can be written as

(9) ER* = a(DR+1), where a=1/(1+k).

The framework includes a number of simplyfying assumptions which are explained in the next slide.

The predominantly age-related public services (education, social and health) account typically for most public service expenditures. Other public service expendiitures, such as security, are often assumed in sustainability analysis to be a fixed share of GDP. In here they are assumed to be part of the net tax share fGDP. Similarly, the non age-related and non-employment-related transfers, such as ODA, are often assumed to be a fixed share of GDP. Here these transfers are assumed also to be included in the net tax share fGDP.

The framework abstracts from funding of public pensions. However, most countries do not have large pre-funding of public pensions. In the case of Finland, mandatory private sector earnings-related pension scheme is included in the national accounts in the public sector. As a result of pre-funding of those pensions, Finland has a negative net public debt. In cases of low or negative initial net public debt, keeping PB=0 should ensure fiscal sustainability..

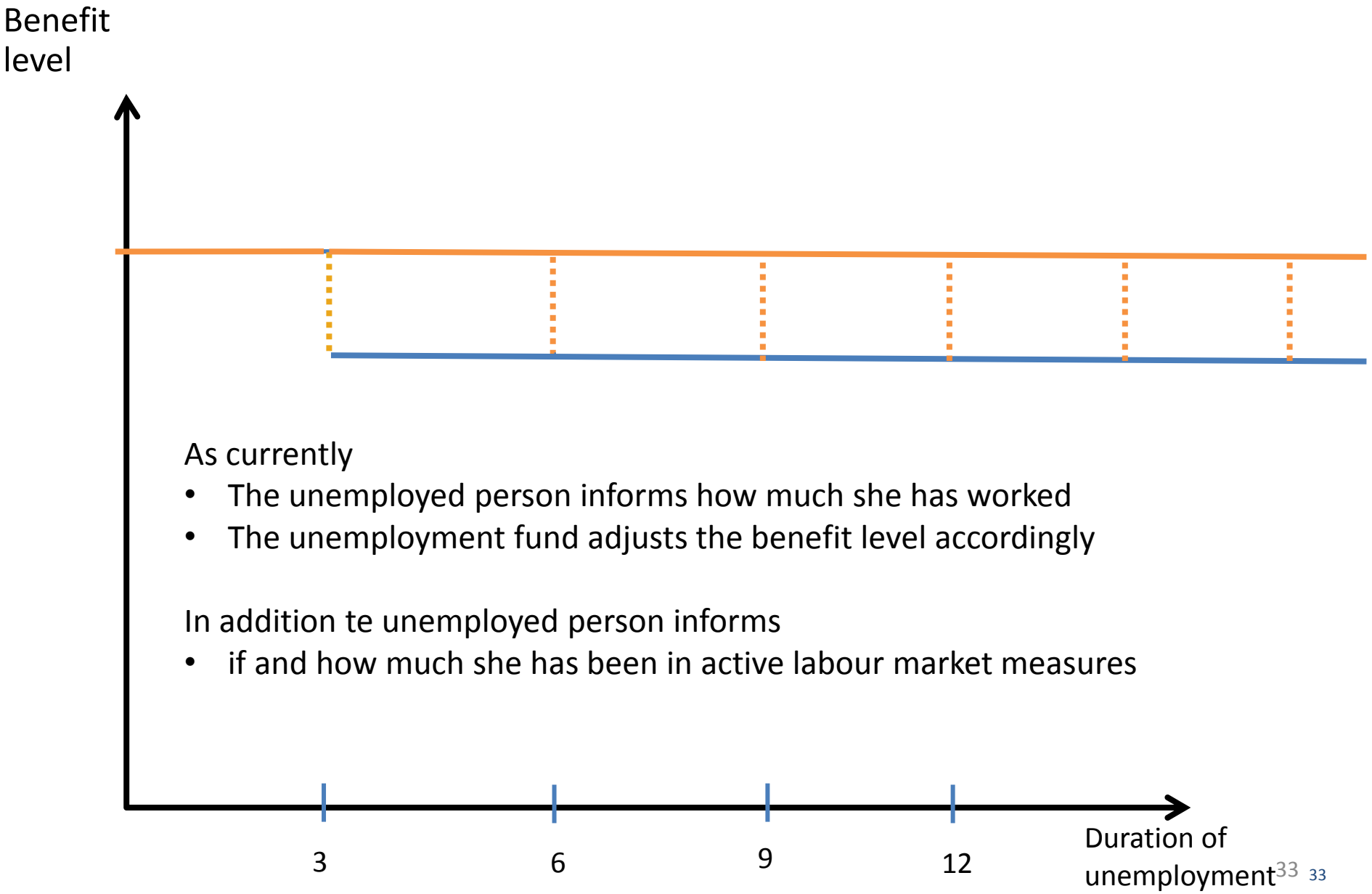
We also abstract from producivity growth. However, if public sector real wages are determined by private sector real wages, which are determined by productivity, and real benefits follow real wages, productivity growth leads to an off-setting growth in public sector real expenditures. Hence public finances are invariant to private sector productivity growth. Given the link between private sector productitvity, via private sector real wages, on public sector real wages and real benefits, in sustainability analysis frameworks in general, private sector productivity growth has a limited effect on fiscal sustainability.

For Finland, base year (2015) ER* is calculated using an empirical rule used in the Ministry of Finance (MoF), according to which, other things being equal, a one percentage increase in employment rate improves the primary balance/GDP by 0.4 %-points. Note that the empirical estimation in slide 5 of that coefficient yields a higher coefficient of 0.8 for Finland. To define parameter a, use 2015 as the base year and ER* in 2015 to get a = 0.455. Hence ER* can be written as
(10) ER* = 0.455(DR+1)

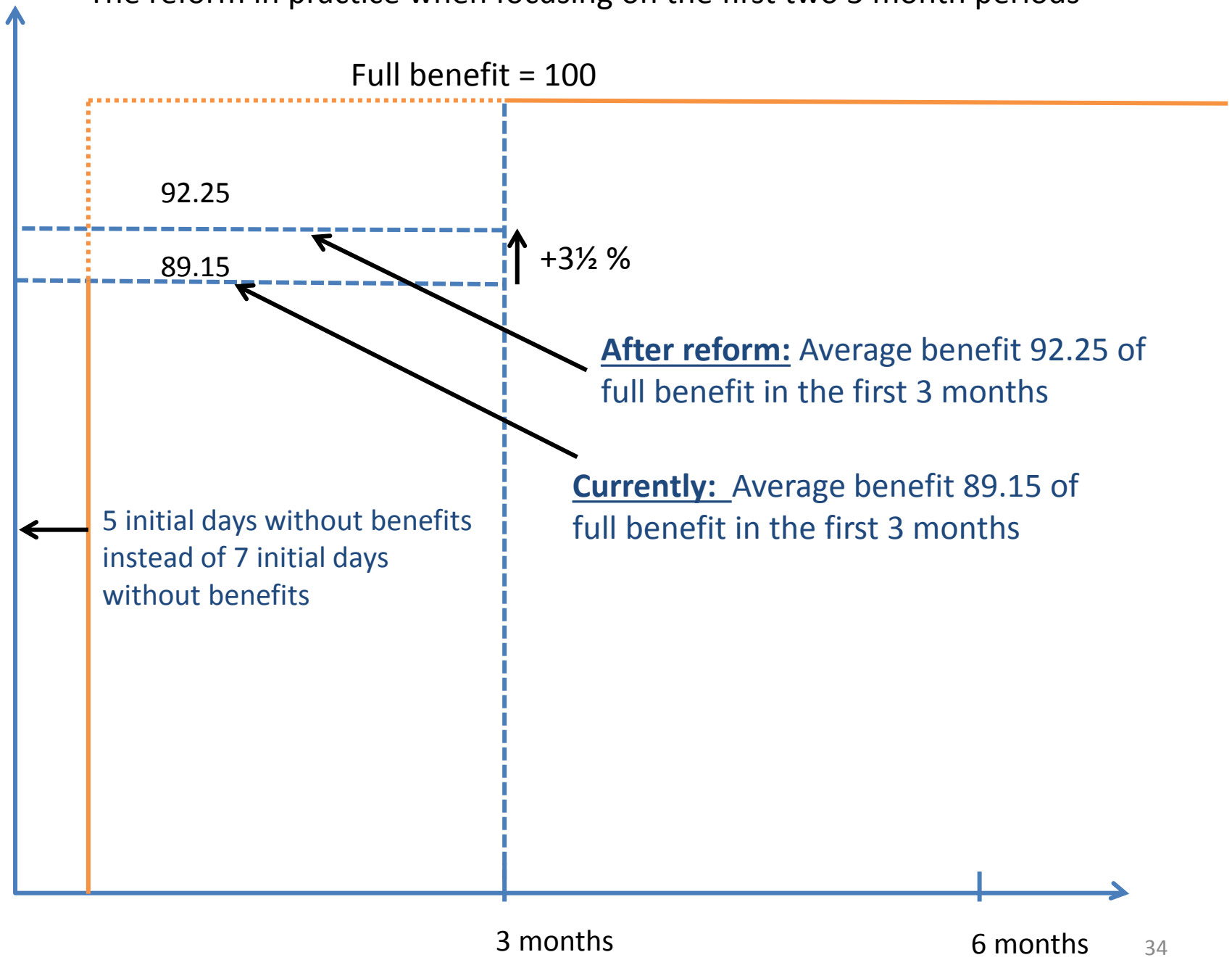
In the empirical application, the previously made assumption that c is constant for all dependent age groups is relaxed. The net expenditures of non-employed NL is taken into account in the empirical realtion between PB and ER.

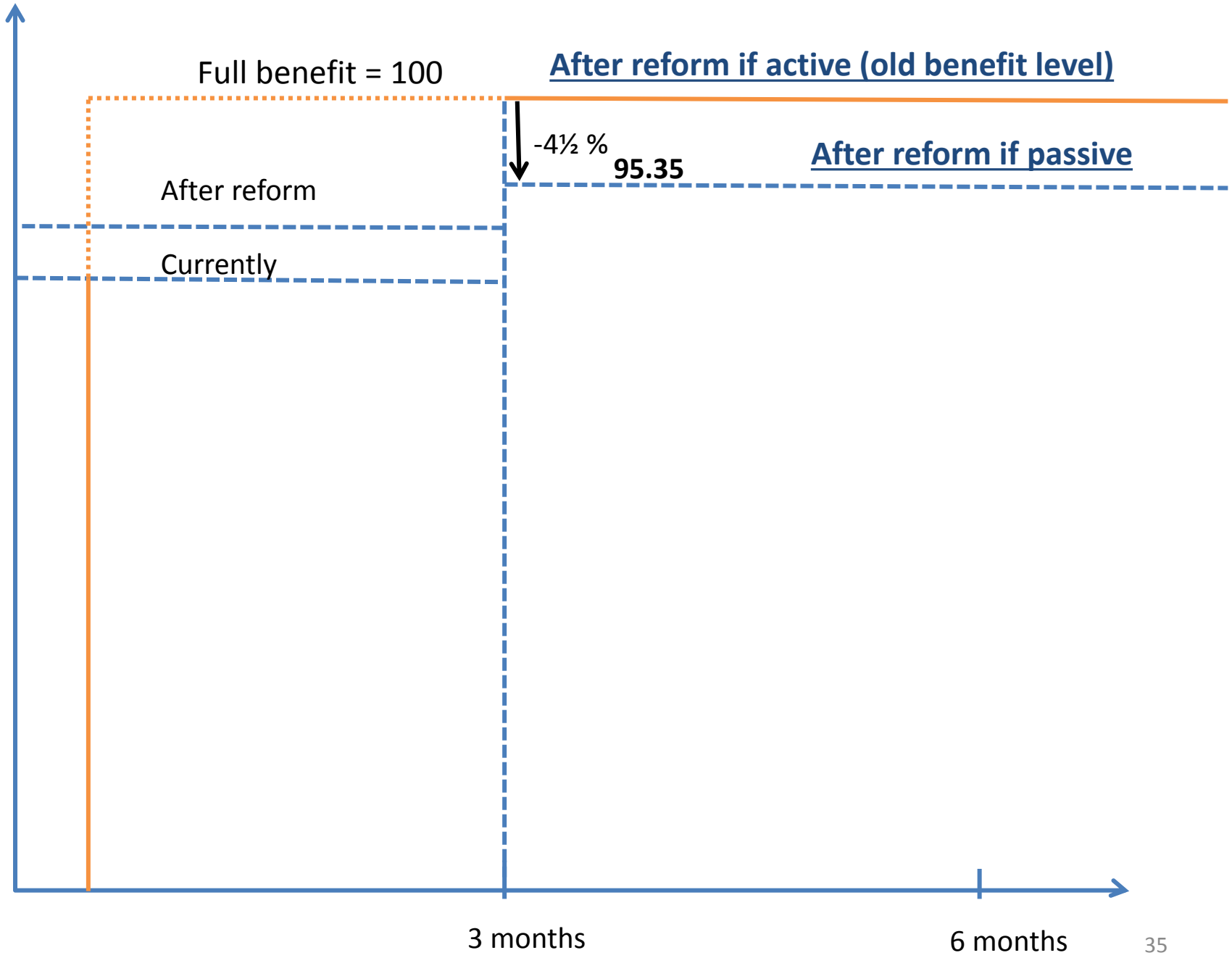
To calculate ER* for Finland for 2015-2030, Hetemäki (2017) divides the dependent age population into three age groups (age 0-14, 65-74 and over 74), takes into account the net public expenditure/person in each age group and population forecast of each age group. Data and calculations are included in a presentation available on MoF web site:
http://vm.fi/documents/10623/3814346/Huoltosuhteen+nousun+ik%C3%A4jakauma+ja+kustannusvaikutus/b5bbea8b-af65-4688-8f0b-e4d8217c4e0a

Appendix B: The unemployment insurance reform in practice



The reform in practice when focusing on the first two 3 month periods




Full benefit = 100
After reform if active (old benefit level)
-4½ %
95.35
After reform if passive
After reform
Currently
3 months
6 months

The basic idea for the Finnish UI reform came from a recent UI reform in Denmark

- In Denmark, an unemployed is one day without benefit in a 4 month period if she has not worked enough corresponding roughly to a 1 % benefit cut (4½ % cut in Finland)

- But in the Danish system the work requirement to avoid the 1 % cut is longer than the one to avoid the 4½ % cut in the Finnish system (only 18 hours in a 3 months period)

- In Denmark benefit cut avoided only by work, in Finland also by participating in active labour market measures at least in 5 days over the 3 months period

The Finnish UI reform is planned to enter into force in 2018

Appendix C: Effect of increased life expectancy on long-term care costs

- If increased life expectancy simply postpones the period of intense care needs, age itself is not necessarily an important determinant of health care expenditures. Based on Zweifel at al (1999), this hypothesis has received much attention.
- Zweifel et al used individual-level Swiss data to show that the impact of age on health care costs decreases once time to death is taken into account. In particular, during the last two years of life, an individual's actual age seems to be completely irrelevant. However, subsequent studies have criticised the approach of Zweifel et al. on several grounds.
- By addressing the apparent econometric problems in Zweifel, Karlsson and Klohn (2013)* reach the following conclusions on long-term care (LTC) costs using data for the entire Swedish population:
- *"The general message emerging from our analysis regarding changes of future care costs is pessimistic."*
- *"Especially the number of the oldest old remains a relevant predictor for LTC costs. Hence, it appears that as far as LTC in Sweden is concerned, an 'expansion of morbidity' can be expected, meaning that unhealthy years are added to life when life expectancy increases."*

**Karlsson, M. and F. Klohn, (2014), "*Testing the red herring hypothesis on an aggregated level: ageing, time-to-death and care costs for older people in Sweden." The European Journal of Health Economics . Vol 2014 (2013) No 15, p. 533-551. https://www.med.uio.no/helsam/forskning/nettverk/hero/publikasjoner/skriftserie/2011/2011_6.pdf

Karlsson and Klohn (2013) summarise their approach as follows: *"By controlling for local mortality rates, we were able to address the issue of whether TTD [time to death] is a better predictor of care costs than age. An advantage of our study is that the data used cover the entire Swedish population. Therefore, our estimates can be assumed to be representative for Sweden as a whole. Besides, since we have a panel dataset, our model allows for unobserved heterogeneity. We used the Fixed Effects estimator and also considered IV estimation to achieve exogenous variation in TTD, and hence to account for the potential problem of reverse causality. The main innovation of our paper is that our measure for TTD allows us to control for the individual end-of-life morbidity effects on the aggregated level."*