



## Key Challenges for the Baltic Sea Region: Demography

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DEMIFER Project:

[http://www.espon.eu/main/Menu\\_Projects/Menu\\_AppliedResearch/demifer.html](http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/demifer.html)



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## Context

- ❑ There is a **wide spectrum of population futures** projected for European country populations.
  - ❑ Many in **Eastern and Central Europe** are either declining or are about to decline
  - ❑ In **Southern Europe populations** have grown recently but may decline as the economic crisis turns off flow of immigrants
  - ❑ In **Western and Northern Europe** still have growth prospects because of favourable demographic regimes and net inflows of international migrants
- ❑ All countries face **population ageing** because of past population history which will challenge the basis of the support for incomes, health and independence of older people
- ❑ In some countries the combination of population ageing and immigration will result in a **Third Demographic Transition** which will reshape the ethnic composition of European countries
- ❑ The **current economic crisis** may be slowing some of these trends but has not yet altered them

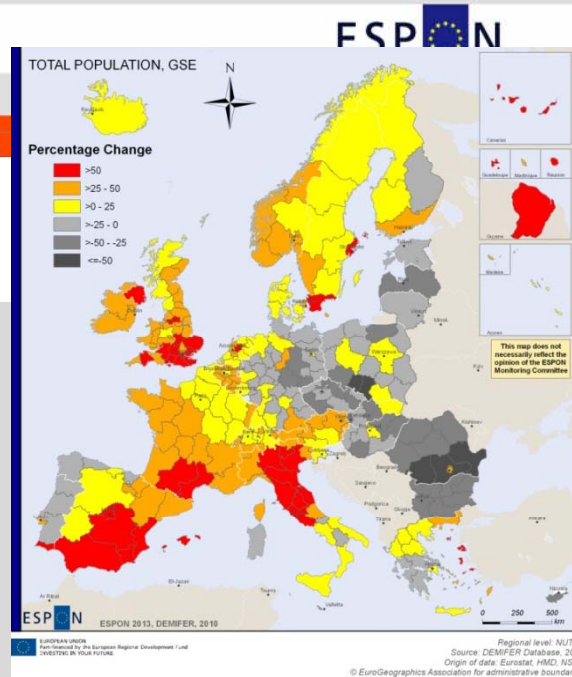
# Population projections for Europe

- ❑ Population projections are produced for European countries and regions by:
  - ❑ **National Statistical Organizations**, NSOs (e.g. Statistics Finland)
  - ❑ **International Statistical Organizations**, ISOs (e.g. EUROSTAT, United Nations)
  - ❑ **Demographic Research Teams**, DRTs (e.g. Uncertain Population of Europe project, DEMIFER project)
- ❑ NSOs produce annual or biennial projections with using the most recent base populations and trends, but they use different methods and are difficult to harmonize
- ❑ ISOs produce harmonised biennial projections using the same methods but are dependent on data provided by NSOs, which may be delayed or not comparable
- ❑ DRTs use both ISO and NSO data and experiment with new methods of population projection (e.g. UPE-probabilistic projection, DEMIFER-policy scenario projections)
- ❑ For the six NORBA countries we use the DEMIFER (DRT), EUROSTAT and United Nations projections

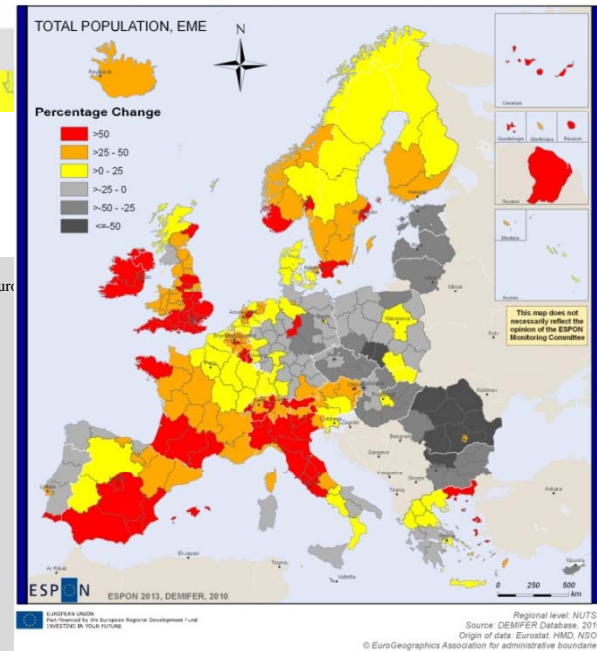
## The projections used

Source	Variant	Description
DEMIFER	STQ	Status Quo (2005 pop base)
DEMIFER	GSE	Growing Social Europe (2005 pop base)
DEMIFER	LSE	Limited Social Europe (2005 pop base)
DEMIFER	EME	Expanding Market Europe (2005 pop base)
DEMIFER	CME	Challenged Market Europe (2005 pop base)
EUROSTAT	EURPOP	2010 population base
United Nations	MEDIUM	2010 population base, medium variant
United Nations	HIGH	2010 population base, high variant
United Nations	LOW	2010 population base, low variant
Model		Description
DEMIFER	MULTIPOLES	Multi-country and multi-region cohort-component
EUROSTAT	NIDI model	Multi-country cohort component
United Nations	Pop Division	Single country cohort component

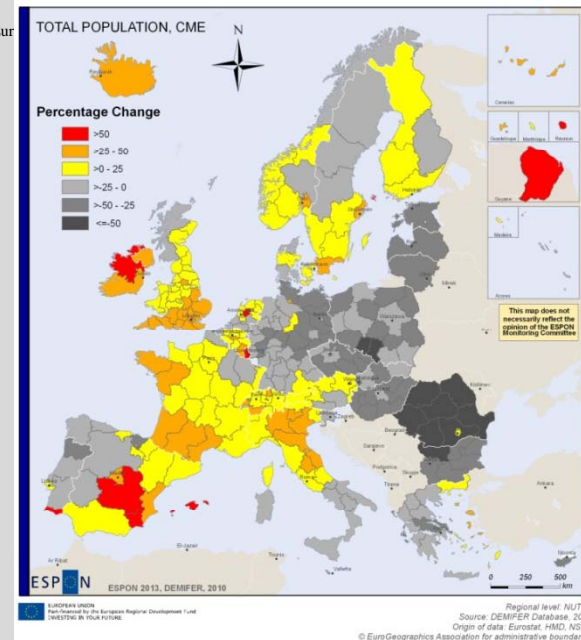
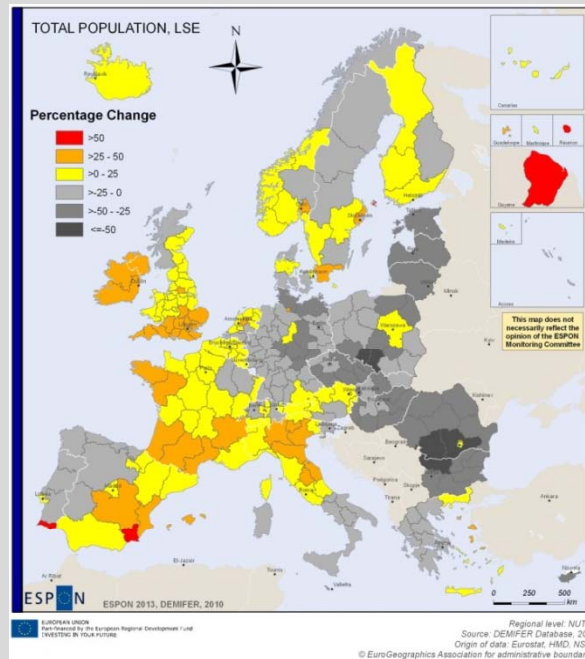
What happens at regional scale Population change 2005-2050 under the four DEMIFER policy scenarios



Market Eur



Market Eur



# How much population change?

Projection	Estonia		Finland		Iceland		Latvia		Norway		Sweden	
	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050
2010=100												
DEMIFER-STQ	81	62	101	96	110	107	76	54	106	105	106	106
DEMIFER-GSE	89	81	110	120	107	104	83	73	114	128	115	133
DEMIFER-LSE	87	76	105	104	108	106	83	70	109	111	108	112
DEMIFER-EME	85	74	111	125	120	139	77	60	117	136	119	143
DEMIFER-CME	83	67	104	104	117	126	77	57	109	113	110	116
EUROPOP2010	96	91	107	107	112	129	90	80	119	131	113	120
UN-MEDIUM	97	92	105	105	122	135	92	84	114	124	111	116
UN-HIGH	102	105	110	118	128	151	97	97	120	139	116	131
UN-LOW	92	80	100	93	116	119	87	73	109	110	105	103
Average	90	81	106	108	116	124	85	72	113	122	111	120

Pink cells indicate population loss  
 Blue cells indicate population gains

## Commentary on population change

- ❑ Under the DEMIFER scenarios, the populations of Estonia and Latvia experience substantial **population decline**
- ❑ The EUROPOP2010 and UN variants project **more moderate decline**. Only under the UN High assumptions does the Estonian population grow.
- ❑ Under all projections Finland, Iceland, Norway and Sweden experience **population growth**. The growth is highest under the EME and GSE DEMIFER scenarios and the UN Medium and High variants. The DEMIFER model builds in migration flows from the eastern countries to Western and Nordic countries.
- ❑ Note that the STQ scenario which assumes mortality, fertility and migration rates constant at base values of a period centred on 2005, sees **lowest growth or most decline**. Higher growth in the other projections is due to improving survival (lower mortality), a recovery in fertility in the 2000-2010 period, which applies in Sweden and Norway and an increase in immigration from outside Europe.



# How much population ageing?

Projection	Estonia		Finland		Iceland		Latvia		Norway		Sweden	
	Change		Change		Change		Change		Change		Change	
	%65+ in 2010	%65+ in 2010-50	%65+ in 2010	%65+ in 2010-50	%65+ in 2010	%65+ in 2010-50	%65+ in 2010	%65+ in 2010-50	%65+ in 2010	%65+ in 2010-50	%65+ in 2010	%65+ in 2010-50
DEMIFER-STQ	17	7	17	6	12	13	17	7	15	7	18	4
DEMIFER-GSE	17	15	17	11	12	23	17	13	15	12	18	8
DEMIFER-LSE	17	14	17	12	12	19	17	14	15	13	18	10
DEMIFER-EME	17	15	17	10	12	17	17	13	15	10	18	6
DEMIFER-CME	17	15	17	12	12	17	17	14	15	12	18	9
EUROPOP2010	17	11	17	9	12	8	17	13	15	9	18	6
UN-MEDIUM	17	8	17	8	12	11	18	8	15	9	18	6
UN-HIGH	17	5	17	6	12	9	18	5	15	6	18	4
UN-LOW	17	11	17	12	12	14	18	12	15	12	18	9
Average	17	11	17	9	12	14	17	11	15	10	18	7

Notes: Blue = change  $\geq 10\%$ , Pink = change  $< 10\%$

## Commentary on population ageing (1)

- ❑ Population ageing, defined here as an **increase in the share of a population aged 65 or over**, is occurring throughout Europe. This is true of the six NORBA countries.
- ❑ **Iceland** has a **younger** population and **Sweden** a slightly **older** population than the others.
- ❑ **Estonia** and **Latvia** experience the **greatest increase** in the percent of the population aged 65+.
- ❑ **Sweden, Iceland, Norway** and **Finland** experience less ageing.
- ❑ The increases in the percentage of the population which are 65 or older are greater in the **DEMIFER scenario projections** than in the EUROPOP2010 or United Nations variants. The reason for this is that we assumed decreases in age-specific mortality rates to continue at the rate observed in the 1992-2005 period of **3.8% per annum**. This means larger numbers survive into older ages. Other projections are less optimistic.

## Commentary on population ageing (2)

- ❑ There is an additional contribution from **cohort replacement**: the cohorts born in 1945-1985 were larger in most European countries than the cohorts born 1915-1944 who are present in the 2010 population.
- ❑ To **measure** these two effects, assume the STQ projection with constant mortality measures the cohort replacement effect. Average the other DEMIFER projections and subtract the STQ%, to provide estimates of 31 to 52% for the mortality decline effect and 48 to 69% for the cohort replacement effect.
- ❑ The **cohort replacement effect** accounts for more than 60% of the change in Iceland and Norway, while the effect contributes 48% in Estonia, Latvia and Sweden.
- ❑ The increasing longevity effect would be **smaller** in EUROPOP2010 and United Nations Variants.
- ❑ Note the **method** for making this estimate needs further development.

## How many working age people will there be to support old people?

Projection	Estonia		Finland		Iceland		Latvia		Norway		Sweden	
	2010	2050	2010	2050	2010	2050	2010	2050	2010	2050	2010	2050
OSR65+												
DEMIFER-STQ	3.62	2.36	3.59	2.45	4.80	2.10	3.64	2.49	3.95	2.49	3.25	2.55
DEMIFER-GSE	3.66	1.52	3.64	1.80	4.83	1.35	3.70	1.69	4.02	1.88	3.31	1.99
DEMIFER-LSE	3.67	1.66	3.64	1.81	4.83	1.55	3.70	1.74	4.01	1.85	3.30	1.91
DEMIFER-EME	3.66	1.57	3.64	1.93	4.86	1.72	3.70	1.72	4.02	2.04	3.31	2.16
DEMIFER-CME	3.66	1.70	3.64	1.89	4.86	1.77	3.70	1.79	4.01	1.95	3.30	2.03
EUROPOP2010	3.62	1.90	3.53	2.02	4.97	2.66	3.60	1.71	4.01	2.24	3.23	2.18
UN-MEDIUM	3.59	2.15	3.48	2.02	4.97	2.28	3.51	2.08	4.07	2.22	3.21	2.14
UN-HIGH	3.59	2.37	3.48	2.20	4.97	2.47	3.51	2.31	4.07	2.40	3.21	2.32
UN-LOW	3.59	1.93	3.48	1.84	4.97	2.08	3.51	1.86	4.07	2.03	3.21	1.96
Average	3.63	1.91	3.57	2.00	4.89	2.00	3.62	1.93	4.03	2.12	3.26	2.14

OSR65+ = Old Age Support Ratio for older people aged 65+

OSR65+ = Population aged 20-64/Population aged 65+

## Commentary on old age support

- ❑ Why the old age support ratio is important:
  - ❑ Working age people provide **taxes** that are the main income to national pension schemes, although some richer older people may also contribute. Even if the national pension scheme has been converted into a funded system, there will still need be **social contributions to support poorer older people** who don't have a full contribution record.
  - ❑ Working age people also provide the **work force** for the health and social care services, which are used much more by older people.
- ❑ There is a **substantial decline** in the OSRs between 2010 and 2050 of 54% on average. In 2010 the OSRs range between 3.26 (Sweden) and 4.89 (Iceland). In 2050 the OSRs have reduced to a range between 1.91 (Estonia) and 2.14 (Sweden). Note that the DEMIFER scenarios project an even greater decline because more people survive and accumulate in old age. Note that Iceland's favourable position in 2010 is wiped out by 2050, while Sweden has moved from having the lowest OSR among the NORBA six to having the highest.

## What happens when you change the threshold age?

Projection	Latvia			Sweden		
	2010	2050	2050	2010	2050	2050
	OSR65+	OSR70+	OSR75+	OSR65+	OSR70+	OSR75+
DEMIFER-STQ	3.64	4.11	7.01	3.25	3.75	5.86
DEMIFER-GSE	3.70	2.48	3.65	3.31	2.72	3.84
DEMIFER-LSE	3.70	2.63	4.01	3.30	2.65	3.82
DEMIFER-EME	3.70	2.56	3.87	3.31	2.96	4.19
DEMIFER-CME	3.70	2.76	4.34	3.30	2.83	4.10
EUROPOP2010	3.60	2.63	4.07	3.23	3.06	4.46
UN-MEDIUM	3.51	3.60	5.27	3.21	3.25	4.38
UN-HIGH	3.51	3.91	5.73	3.21	3.48	4.70
UN-LOW	3.51	3.28	4.81	3.21	3.01	4.06
Average	3.62	3.11	4.75	3.26	3.08	4.38

## Commentary on changing the threshold age

- ❑ Faced with the decline in OSRs, policy makers have listened to demographers and are revising the threshold age for eligibility for basic state pensions.
- ❑ The table shows what happens when you move the threshold upwards to 70 and to 75. The older population is reduced and the working age population is increased. Just two examples are provided: the country with the most ageing and that with the least.
- ❑ Let us assume the goal is to maintain the OSR at 2010 levels. We can see that raising the threshold to 70 in 2050 does not do the job though OSRs are close in Sweden. Raising the threshold to 75 overshoots and the OSR75+ 2050 values are above the OSR65+ 2010 values. The following ages would be needed:
  - ❑ Estonia: 72
  - ❑ Finland: 72
  - ❑ Iceland: 77
  - ❑ Latvia: 72
  - ❑ Norway: 74
  - ❑ Sweden: 71

# Who will look after the very old?

Projection	Estonia		Finland		Iceland		Latvia		Norway		Sweden	
	2010	2050	2010	2050	2010	2050	2010	2050	2010	2050	2010	2050
VOSR												
DEMIFER-STQ	13.71	7.48	11.48	5.57	12.00	5.30	13.95	9.03	8.63	6.18	7.60	6.27
DEMIFER-GSE	14.50	2.03	12.01	2.08	12.44	1.87	14.77	2.48	9.05	2.38	7.99	2.47
DEMIFER-LSE	14.50	2.76	12.01	2.45	12.42	2.30	14.76	3.19	9.05	2.75	7.98	2.81
DEMIFER-EME	14.49	2.32	12.01	2.28	12.47	2.41	14.77	2.89	9.05	2.60	7.99	2.69
DEMIFER-CME	14.49	3.27	12.01	2.70	12.46	2.78	14.76	3.96	9.05	3.02	7.98	3.09
EUROPOP2010	12.14	3.42	10.70	2.98	11.43	3.33	12.87	3.51	8.16	3.72	7.20	3.50
UN-MEDIUM	11.47	4.39	10.59	2.92	11.48	3.62	11.94	4.78	8.36	3.54	7.18	3.33
UN-HIGH	11.47	4.39	10.59	2.92	11.48	3.62	11.94	4.78	8.36	3.54	7.18	3.33
UN-LOW	11.47	4.39	10.59	2.92	11.48	3.62	11.94	4.78	8.36	3.54	7.18	3.33
Average	13.14	3.83	11.33	2.98	11.96	3.20	13.52	4.38	8.67	3.47	7.59	3.42

VOSR = Population aged 50-64/Population aged 85+



## Commentary on looking after the very old

- ❑ The very old will have the **greatest level of disability** and require the most support, if they become more dependent.
- ❑ We define the **VOSR** as the ratio of the very old (aged 85+) to the generation of their children (aged 50-64).
- ❑ In 2010 there are few people aged 85+, so the ratios are high but by 2050 the VOSRs have fallen drastically.
- ❑ The populations in **carer age groups** show either small declines or small increases which don't match the increases in the numbers of their parents surviving to be 85 or more years old
- ❑ **Estonia** and **Latvia** catch up with their Nordic neighbours. The decrease in OSRs in **Sweden** is limited by a slight rise in the 50-64 population.

## Scenarios for the populations of Europe: references

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Philip Rees, Nicole van der Gaag, Joop de Beer, Frank Heins (2012)

European regional populations: current trends, future pathways and policy options. *European Journal of Population*, in press

# DEMI FER Policy Scenarios

<p><b>Growth enabled by technical and social innovation</b></p>	<p><b>GROWING SOCIAL EUROPE (GSE)</b>  <b>High Growth/Collectivism</b></p>	<p><b>EXPANDING MARKET EUROPE (EME)</b>  <b>High Growth/Individualism</b></p>
<p><b>Growth limited by environmental constraints</b></p>	<p><b>LIMITED SOCIAL EUROPE (LSE)</b>  <b>Low Growth/Collectivism</b></p>	<p><b>CHALLENGED MARKET EUROPE (CME)</b>  <b>Low Growth/Individualism</b></p>
	<p><b>Collectivism</b></p>	<p><b>Individualism</b></p>
	<p><b>DISTRIBUTION-FAIRNESS</b></p>	

## Policies to improve longevity (1) Mortality

Policy focus	Growing Social Europe (GSE)	Expanding Market Europe (EME)	Limited Social Europe (LSE)	Challenged Market Europe (CME)
<b>Smoking</b>	Stronger policies lead to less smoking	Same policies as now, level stable	Stronger policies lead to less smoking	Same policies as now, level stable
<b>Diet/Obesity</b>	Public health policies prevent further rises	Public health policies prevent further rises	Policies ineffective epidemic continues	Policies ineffective epidemic continues
<b>Drinking/Drug Use</b>	Tax rises and restrictions lead to falls in consumption	No additional measures so stays on trend	Tax rises and restrictions lead to falls in consumption	No additional measures so stays on trend
<b>Medical Advances</b>	Progress in extending healthy life is high	Progress in extending healthy life is medium-high	Progress in extending healthy life is medium-low	Progress in extending healthy life is low
<b>Inequalities</b>	Policies target lagging groups, regions, inequality reduces	Policies fail to target lagging groups, regions, inequality persists	Policies target lagging groups, regions, inequality reduces	Policies fail to target lagging groups, regions, inequality persists

## Policies for Growing Social Europe: to improve longevity (2) Example of medical advances

- ❑ Eliminate deaths caused by **infectious diseases**
  - ❑ Immunize children against *diphtheria*, *tetanus*, **pertussis** (whooping cough), **polio**, Haemophilus influenzae type b, pneumococcal infection, meningitis C, **measles**, **mumps**, rubella, HPV (cervical cancer virus) (girls)
  - ❑ Immunize those 65 and over, **flu** (every year), pneumococcal infection
  - ❑ Vaccinate at risk groups against: hepatitis B, **tuberculosis**, flu, **varicella** (chicken pox)
  - ❑ Maintain vigilance against **MRSA** (meticillin-resistant staphylococcus aureus), Escherichia coli (Shigella) , Clostridium difficile through a high level of hygiene (Simmelweis)
  - ❑ Prevent and treat Sexually Transmitted Diseases (e.g. HIV)
- ❑ Treat and prevent **cardiovascular disease**
  - ❑ Treat persons with symptoms with statins, but unclear whether symptom-free but at risk persons should take statins as a preventive
  - ❑ Persuade people to stop smoking
- ❑ Encourage presentation early at your doctor with symptoms linked to **cancer**
  - ❑ Screening programmes for breast cancer, **bowel cancer**

## Policies for Growing Social Europe: to encourage more children

Policy focus	Growing Social Europe (GSE)	Expanding Market Europe (EME)	Limited Social Europe (LSE)	Challenged Market Europe (CME)
<b>Family or individual goals</b>	Family goals are stressed	Individual freedoms are stressed	Family goals are stressed	Individual freedoms are stressed
<b>Family friendly policies</b>	Strong policies are adopted	Weak policies are adopted	Strong policies are adopted	Weak policies are adopted
<b>Assisted conception</b>	Socially supported	Only privately supported	Socially supported	Only privately supported
<b>Abortion law</b>	Permissive	Restrictive	Permissive	Restrictive
<b>Extra-Europe immigration</b>	Contributes to higher fertility	Does not contribute to higher fertility	Does not contribute to higher fertility	Does not contribute to higher fertility
<b>Inequalities</b>	Policies reduce inequalities	Policies do not reduce inequalities	Policies reduce inequalities	Policies do not reduce inequalities

## Policies for Growing Social Europe: international (extra-Europe) migration

Policy focus	Growing Social Europe (GSE)	Expanding Market Europe (EME)	Limited Social Europe (LSE)	Challenged Market Europe (CME)
Total level	Moderate	High	Low	Moderate
Emigration origins	Pattern remains stable	Divergent: poorer regions have higher rates	Pattern remains stable	Divergent: poorer regions have higher rates
Immigration destinations	Pattern remains stable	Divergent: richer regions have higher inflows	Pattern remains stable	Divergent: richer regions have higher inflows
Extra-Europe migration policy	Non-selective immigration	Selective immigration	Non-selective immigration	Selective immigration

## Policies for Growing Social Europe: intra-Europe (inter-country) migration

Policy focus	Growing Social Europe (GSE)	Expanding Market Europe (EME)	Limited Social Europe (LSE)	Challenged Market Europe (CME)
Total level	Moderate	High	Low	Moderate
Differences in out-migration between origins	Country pattern remains stable	Divergent: poorer countries have higher rates	Country pattern converges	Divergent: poorer countries have higher rates
Differences in in-migration between destinations	Country pattern remains stable	Divergent: poorer countries have higher flows	Country pattern converges	Divergent: poorer countries have higher flows
Inter-state migration policy	Restrictions	Free movement	Restrictions	Free movement



## Policies for Growing Social Europe: internal (inter-region within country) migration

Policy focus	Growing Social Europe (GSE)	Expanding Market Europe (EME)	Limited Social Europe (LSE)	Challenged Market Europe (CME)
Total level	Product of projection	Product of projection	Product of projection	Product of projection
Out-migration origins	Country pattern remains stable	Divergent: poorer countries have higher rates	Country pattern remains stable	Divergent: poorer countries have higher rates
Attractiveness of destinations	Country pattern remains stable	Divergent: poorer countries have higher inflows	Country pattern remains stable	Divergent: poorer countries have higher flows
Internal migration policy	Regional policy supports poorer regions	None	Regional policy supports poorer regions	none

## The costs and benefits of intra-Europe population shifts

Year, Projection	High Income Q1	High- Middle Income Q2	Middle Income Q3	Low- Middle Income Q4	Low Income Q5
2005	25.4	19.5	18.6	15.8	20.8
2050 STQ	33.7	22.6	18.7	14.4	10.6
2050 GSE	34.1	22.7	18.7	14.2	10.3
2050 EME	34.4	22.8	18.4	13.9	10.5
2050 LSE	33.7	22.0	19.0	14.7	10.7
2050 CME	34.1	22.3	18.6	14.3	10.7

Quintiles are defined using 2005 GDP using 20% of the number of regions  
 The figures show the percentage of the EU27 population resident in each quintile (the percentages sum across each row to 100%)

## Conclusions

- ❑ Europe's population future is, of course, **uncertain** (as we have shown by presenting results from 9 projections) but there is substantial **agreement** about the direction and structure of change
- ❑ The **eastern** EU countries (e.g. Estonia, Latvia) are expected to experience population **decline**, while the **northern** EU countries will have moderate population **increase** (e.g. Finland, Iceland, Norway, Sweden)
- ❑ Population **ageing** will be universal for all European countries and regions, but our scenario projections suggest the potential has been **under-estimated**
- ❑ Using our scenario projections we estimated that about half of the ageing to 2050 in the NORBA countries would be due to **improvements in longevity** and a half to the "**baby boom**" effect, though the pace and degree of ageing varied
- ❑ Old age **support** ratios will **decline** in all NORBA countries, most in the Baltic countries and least in Sweden reversing the rank order of "oldness" between 2010 and 2050
- ❑ Societies need to move the **old age threshold** used in social pension systems upwards and encourage more private saving, with the projections suggesting that the threshold should be **72** by 2050 on average
- ❑ A key issue arises: how healthy will the larger, older population be? If disability expansion occurs, this will have high costs, so societies should strive for disability compression, through **pro-active health policies**.