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Understanding Irish Labour Force Participation

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Irish Economic Analysis

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Overview

- ▶ Introduction and motivation
- ▶ Approach and contribution
- ▶ Decomposition of the participation rate
- ▶ Individual characteristics and labour market transitions
- ▶ Cohort-based model of labour force participation
- ▶ Summary and conclusion

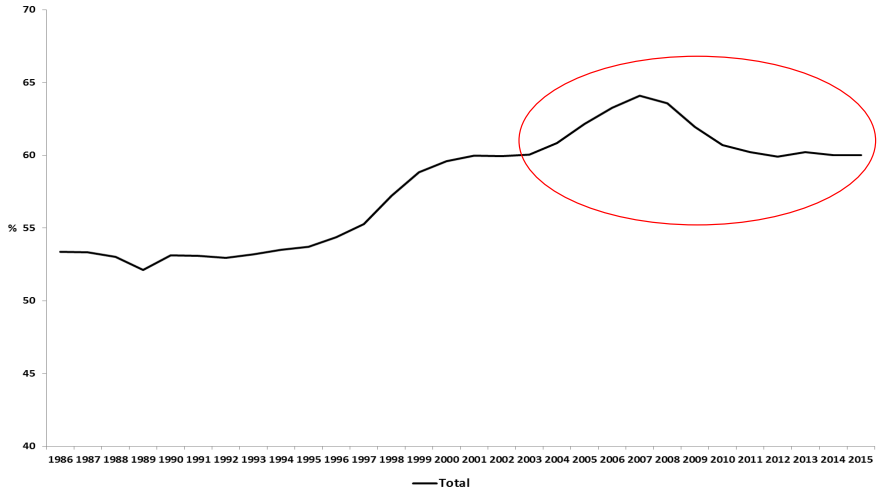


Introduction and Motivation

- ▶ Increase in labour force participation rate (LFPR) a notable feature of the Celtic Tiger and subsequent construction boom
 - ▶ Females in 1990's
 - ▶ Immigration in 2000's
- ▶ As in other countries, decline in LFPR during the Great Recession
- ▶ As in other countries, LFPR relatively absent feature in subsequent recovery
- ▶ Important for policy analysis and design to understand the relative role of:
 - ▶ Cyclical factors (weak labour market, high unemployment)
 - ▶ Structural factors (demographics, social norms, etc.)
- ▶ Implications for actual and potential output growth
 - ▶ Policy responses?



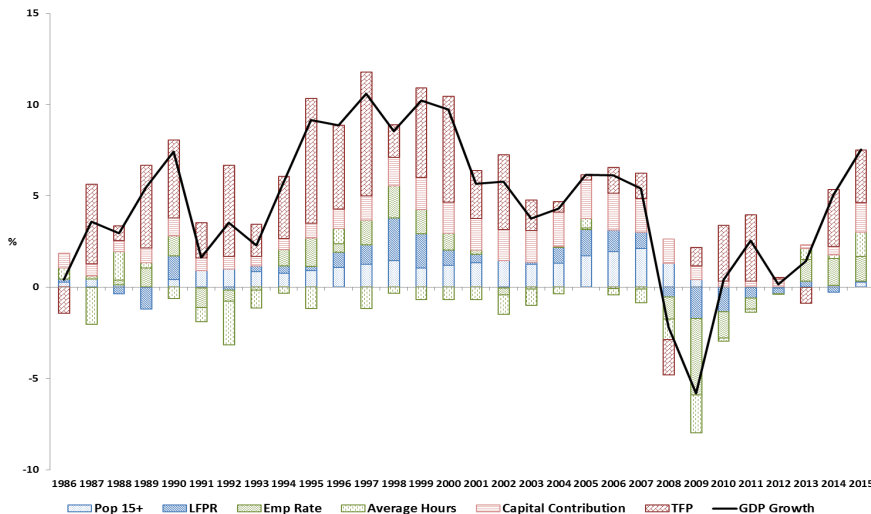
Labour force participation rate



Source: CSO and AMECO.



Some simple growth accounting...





Approach and contribution

- ▶ We build on a number of recent empirical analyses in other countries concerning flows into/out of labour force and the stock LFPR
 - ▶ Theoretical framework following Diamond-Mortenson-Pissarides search/matching model (Erceg and Levin, 2014; Shimer 2013; Krussell *et al* 2012)
 - ▶ Transition probabilities between participation and inactivity (Poterba and Summers, 1995; Alba-Ramirez, 1999; Fabrizi and Mussida, 2009; Rotaru, 2014)
 - ▶ Cohort-based models (Fallick and Pingle, 2007; Aaronson *et al*, 2014; Kudlyak, 2013; Balleer *et al*, 2014)
- ▶ Some related work in an Irish context
 - ▶ LFPR in the context of wider macro model (Newell and Symons, 1990; Barry and Bradley, 1991)
 - ▶ Focussing on the determinants of transitions into/out of the labour force, particularly for females (Walsh, 1993; Russell and O'Connell, 2004)
 - ▶ Descriptive analysis in a comparative context (McCarthy and McQuinn, 2008)
- ▶ Take a micro (flows/transitions) and macro (age-cohort-cycle model) perspective on LFPR developments
 - ▶ Examine relative importance and response of particular demographic groups
 - ▶ Highlight structural/trend factors and the impact of the cycle on LFPR (stock and flow)
 - ▶ Projections of LFPR under various scenarios



Decomposing LFPR developments

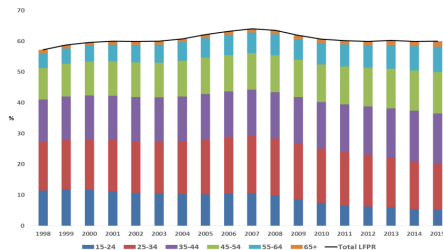
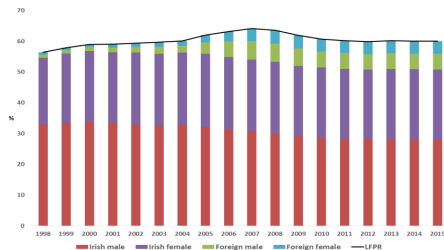
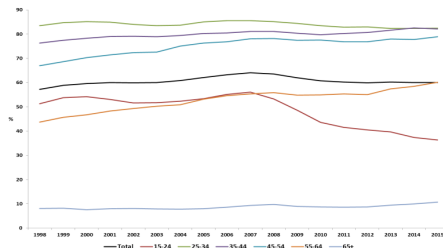
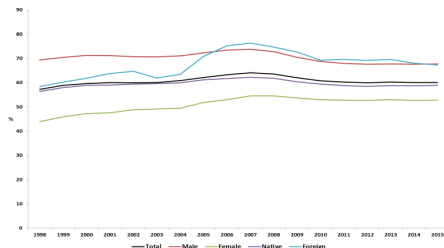
- Aggregate LFPR is population (Pop) weighted sum of LFPR by active age demographic groups (i):

$$LFPR_t = \sum_i s_t^i LFPR_t^i$$
$$s_t^i = \frac{Pop_t^i}{Pop_t}$$

- Use QNHS data to show the relative importance of changes in s_t^i and $LFPR_t^i$
- Examine alternative counterfactuals from 2003 and 2008



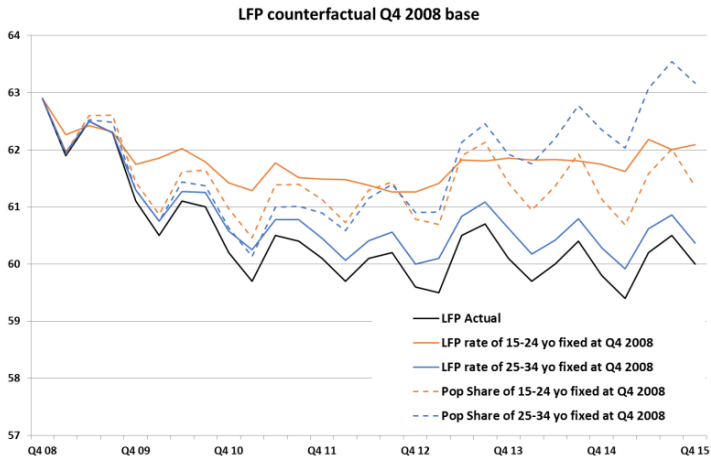
LFPR by gender, nationality, and age group



Source: CSO and Eurostat.



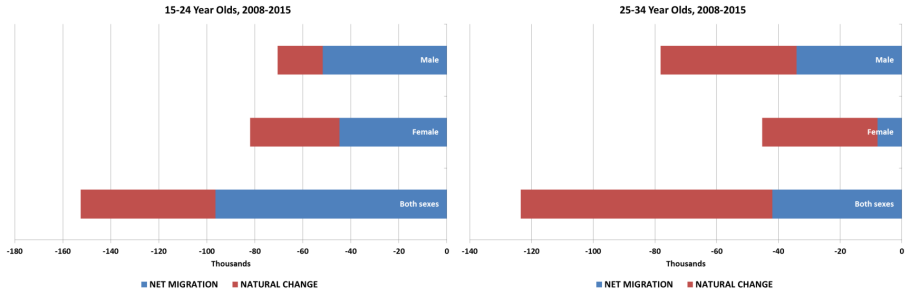
The impact of different demographic groups (2)



Source: CSO and author's calculations.



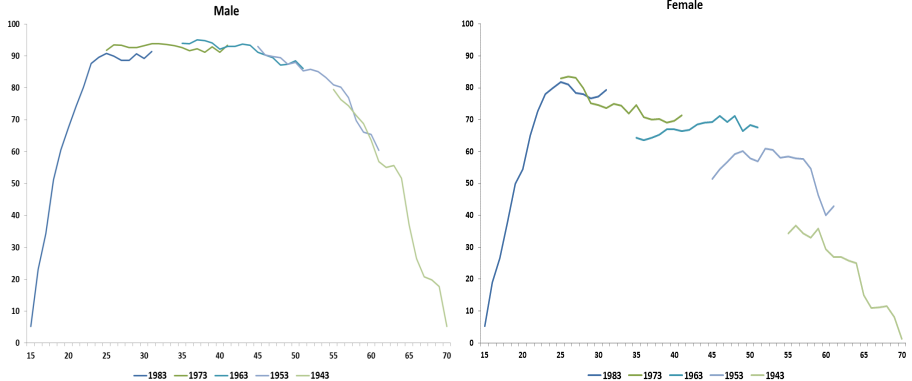
The impact of different demographic groups (3)



Source: CSO and author's calculations.



LFPR by birth cohort



Source: CSO.



The Cycle and Labour Market Transitions

- ▶ Theoretical models with frictions and rigid wages are able to replicate cyclical behaviour of the LFPR evident in the data (Shimer, 2013).
- ▶ Cyclical impact on gross worker flows, or transitions in and out of inactivity identified by Krussell *et al* 2012.
- ▶ Role of individual characteristics in determining how close an agent is to the transition frontier for given state of the cycle.
- ▶ Empirically, we use a discrete choice model to examine role of individual characteristics on transition probabilities
 - ▶ Account for individual characteristics shown in the literature and in our previous counterfactuals thought to fundamentally determine transition probabilities.
 - ▶ Examine whether the cycle has any role in determining the the size of the impact of those characteristics on transition probabilities.



Empirical Model for Labour Market Transitions

- Probability of transitioning in/out of the labour force over four quarter period, where transitioning = 1:

$$Pr(y = 1 | x) = \frac{\exp(x\beta)}{1 + \exp(x\beta)}$$

- Estimated as a logit to get the log likelihood:

$$\ln L(y | x; \beta) = \sum_{i=1}^N \{y_i [x_i \beta - \ln(1 + \exp(x_i \beta))] - (1 - y_i) \ln(1 + \exp(x_i \beta))\}$$

- Derive average marginal effect of covariate of interest j :

$$\frac{\partial Pr(y=1|x)}{\partial x_j}$$

- x = vector of covariates from QNHS microdata file (2000-2014)
 - Age group (15-24, 25-34, 35-44*, 45-54, 55-65, 65+)
 - Educational attainment (7 categories, reference is post-secondary/non-tertiary)
 - Gender = 1 if male
 - Marital status = 1 if married
 - Nationality = 1 if non-Irish
 - Number of children = log(children)
 - Dublin = 1 if living in Dublin
 - Unemployed = 1 if unemployed (in case of transitions out of the labour force)
 - Common time variable (Year) to capture wider economic conditions
- Estimate average marginal effect across whole sample and also at each value of Year to test whether effect varies over the cycle.



Logit Results

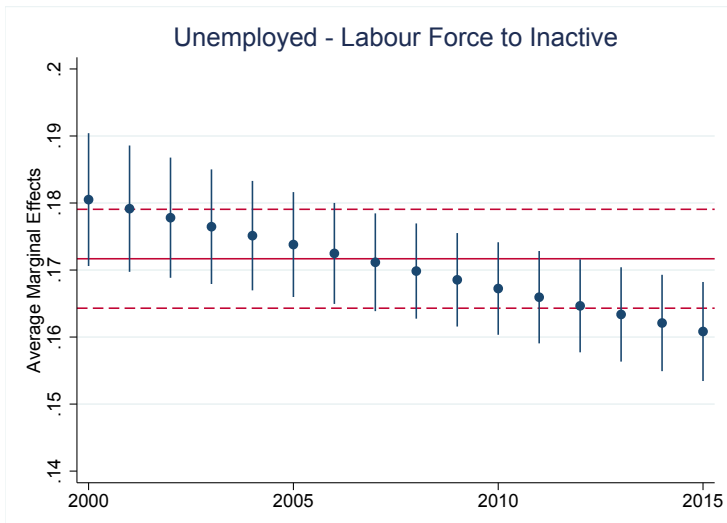
Table: Average Marginal Effects for Transitions

State @ Quarter _t State @ Quarter _{t+4} Average Transition Probability	Labour Force Inactive 0.049	Inactive Labour Force 0.069
15-24 Year Olds	0.086***	0.012***
25-34 Year Olds	0.003**	0.021***
55-64 Year Olds	0.021***	-0.065***
65+ Year Olds	0.080***	-0.105***
Male	-0.036***	0.038***
Second Level Education	0.010***	-0.006*
Third Level Education	-0.001	0.018***
Dublin	0.002**	0.006***
Number of Children	0.003***	-0.004***
Married	-0.003**	-0.012***
Unemployed	0.171***	-
Foreign National	0.009***	0.004
Observations	209,442	145,322

Source: Authors' calculations. Reference for age categories are 35-44 year olds. Reference for educational attained categories is post-secondary/non-tertiary. Year dummy included. ***, **, *, indicate statistical significance at the 1, 5 and 10 per cent levels.



Average Marginal Effects at Different Points in the Cycle - Unemployment





Cohort-based model of LFPR (1)

- ▶ Age and birth-year cohort effects thought of as determinants of the long-run LFPR trend
 - ▶ Common age effects such as impact of tertiary education, family formation, retirement
 - ▶ Cohort effects reflecting impact of changes in social norms and institutions through time
- ▶ Estimate cohort-based model similar to Aaronson *et al* (2014), Kudlyak (2013) and Balleer *et al* (2014)
- ▶ Complement basic model with cyclical determinants similar to Walsh (1993) and consistent with factors highlighted in search/matching models such as Shimer (2013)
- ▶ Identify the relative role of trend and cycle in LFPR developments



Cohort-based model of LFPR (2)

- Trend is estimated for males and females separately:

$$\ln LFPR_t^i = \alpha + \ln \alpha_i + \sum_{b=1928}^{1998} C_{b,i,t} \ln \beta_b + \epsilon_{i,t}$$

- Pooled quarterly data from QNHS micro-data file, $t = 1998q1-2014q4$
 - $LFPR_t^i$ = participation rate of each single year age/gender group (16-70+)
 - α_i = fixed effect for age/gender group i
 - $C_{b,i,t} = 1$ if i in period t includes people born in year b , 0 otherwise
 - β_b = cohort specific fixed effect for people born in year b
-
- Estimates for the aggregate trend LFPR are derived by:

$$\widehat{LFPR}_t^i = \exp(\ln \widehat{LFPR}_t^i + \frac{\sigma_\epsilon^2}{2})$$

$$\widehat{LFPR}_t = \sum_i s_t^i \widehat{LFPR}_t^i$$



Cohort-based model of LFPR (3)

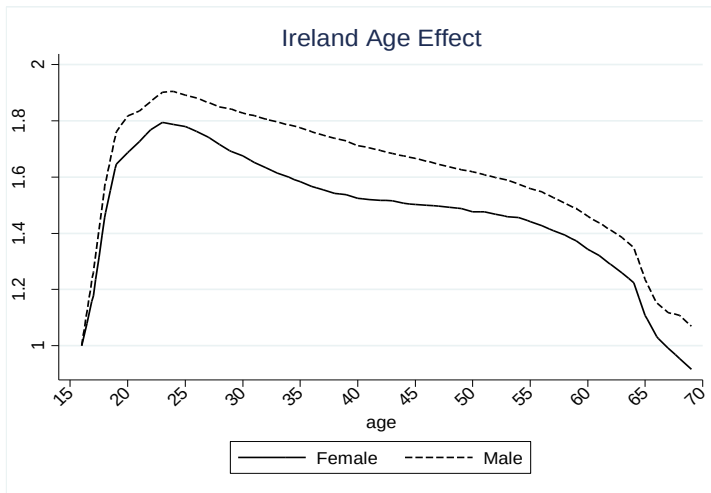
- Cyclical factors are considered with:

$$\ln LFPR_t^i = \alpha + \ln \alpha_i + \sum_{b=1928}^{1998} C_{b,i,t} \ln \beta_b + \lambda_i X_t + \epsilon_{i,t}$$

- Impact of cyclical factors in X differs across age/gender groups:
- X includes log of contemporaneous and two lags of:
 - Unemployment rate
 - Average weekly compensation per employee (Non-Financial Sector Accounts and AMECO)
 - Average weekly unemployment benefit (UB transfers / number unemployed)
 - Returns to participation deflated by personal consumption deflator
- Some things to note:
 - Cohorts with relatively few observations subject to bias
 - Most recent cohorts only observed when very young and in a relatively weak labour market
 - Cohort effects for 1992-1999 restricted to equal previous twenty-year average



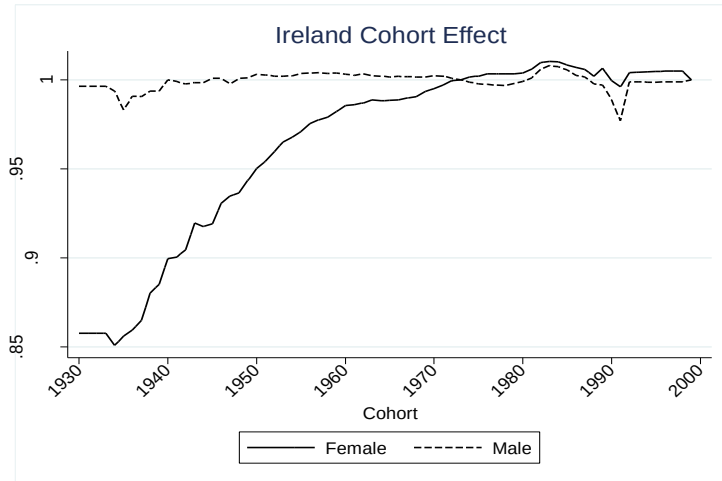
Cohort model - age effect (relative to 16 year olds)



Source: Author's calculations.



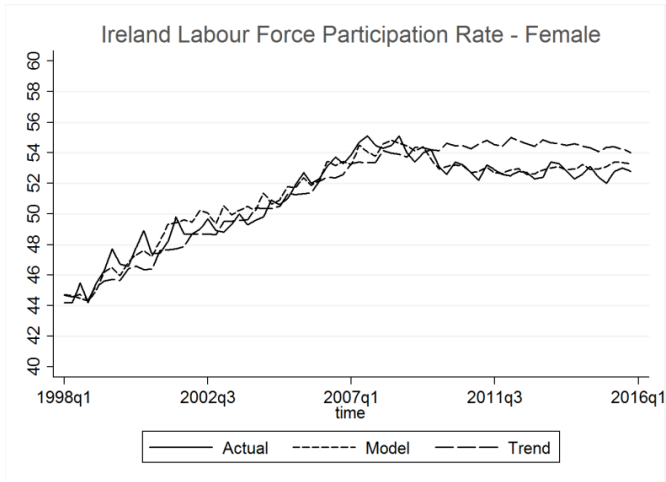
Cohort model - cohort effect (relative to 1973)



Source: Author's calculations.



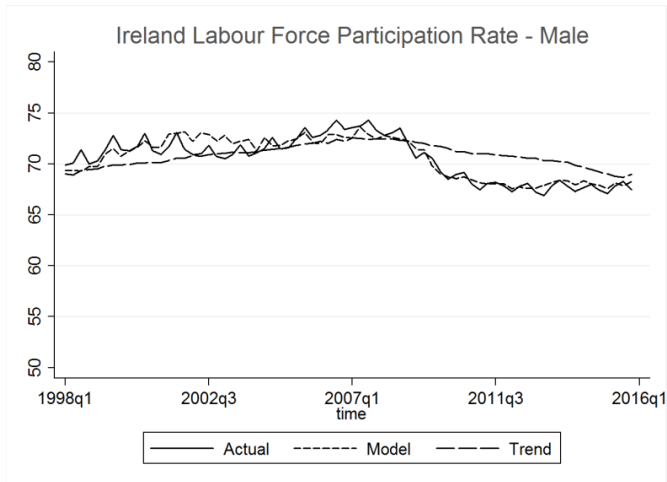
Cohort model with cyclical effects - Female



Source: Author's calculations.



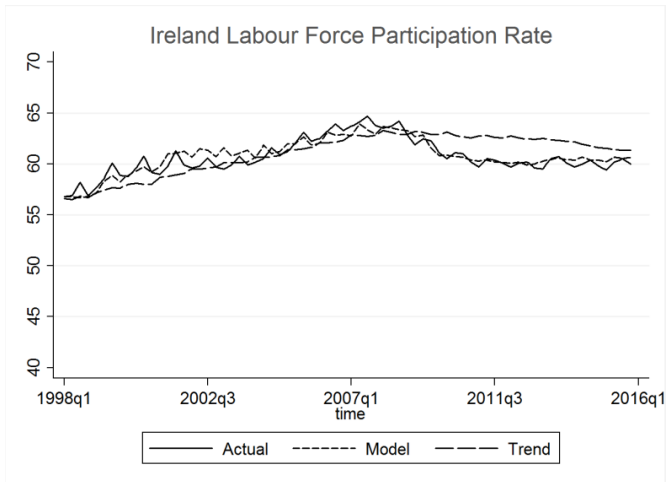
Cohort model with cyclical effects - Male



Source: Author's calculations.



Cohort model with cyclical effects - Total



Source: Author's calculations.



Trend LFPR Projections

Trend Participation Rate With Alternative Population Assumptions

	<u>Female</u>			<u>Male</u>			<u>Total</u>		
	2015	2020	2025	2015	2020	2025	2015	2020	2025
Eurostat 2013 Main	54.4	53.1	51.4	68.4	64.3	60.5	61.0	58.3	55.6
Eurostat 2013 No Migration	54.4	53.5	52.2	68.4	65.0	61.8	61.0	58.8	56.6
Eurostat 2013 Higher Life Expectancy	54.4	53.0	51.3	68.4	64.2	60.4	61.0	58.2	55.5
Eurostat 2013 Reduced Migration	54.4	53.1	51.6	68.4	64.4	60.8	61.0	58.4	55.8
CSO 2011 No Net Migration (M0)	54.4	53.4	52.0	68.4	64.7	61.1	61.0	58.7	56.2
CSO 2011 High Net Immigration (M1)	54.4	53.6	53.0	68.4	64.9	62.2	61.0	58.9	57.3
CSO 2011 Low Net Immigration (M2)	54.4	53.4	52.2	68.4	64.7	61.3	61.0	58.6	56.4
CSO 2011 Low Net Emigration (M3)	54.4	53.0	51.4	68.4	64.3	60.4	61.0	58.2	55.6
Average	54.4	53.3	51.9	68.4	64.6	61.1	61.0	58.5	56.1
Female Age Effect Counterfactual (M2)	57.2	55.8	54.1	68.4	64.7	61.3	62.5	60.0	57.5

Source: Author's calculations, CSO 2016-2046 Population Projections (2011) and Eurostat Population Projections (2013). Projections used from the CSO have a common total fertility rate assumption of 2.1 alongside a gradual reduction in mortality rates. See the CSO publication for more details on these and the M0, M1, M2 and M3 migration assumptions. Projections from Eurostat have a common total fertility rate assumption of 2.01. The Main Eurostat projection also assumes a mortality rate of 0.0054 by 2025 and net migration remaining negative out to 2025. The Eurostat Higher Life Expectancy scenario assumes a mortality rate of 0.0052 by 2025, whereas the Reduced Net Migration scenario assumes net emigration being twenty per cent lower than the Main scenario. The Female Age Effect Counterfactual sets the shape of the age effect for females from 25-55 years of age to be proportionate to the male effect for these age groups and uses the M2 CSO scenario for the population projections.





Summary and conclusions

- ▶ Strong level of inward migration boosted LFPR during the mid-2000s above what would have been expected at start of the century.
- ▶ LFPR developments during the crisis and recovery driven by reaction of young men in particular.
- ▶ Unable to identify economically significant effects of the cycle on fundamental transition probabilities.
- ▶ Evidence that the decline in LFPR since 2008 for both males and females dominated by cyclical effects.
- ▶ Age and cohort effects are dragging down trend male LFPR, with little scope for further positive cohort effects to boost female LFPR.
- ▶ In absence of strong cyclical response, trend LFPR will weigh on actual LFPR over the next decade
 - ▶ Contribution of labour supply to actual and potential output growth diminished.
 - ▶ Policy changes to promote higher female participation will support trend LFPR but not sufficient to fully offset decline in the male trend.
 - ▶ Higher immigration, particularly non-Irish, would boost trend and actual LFPR.



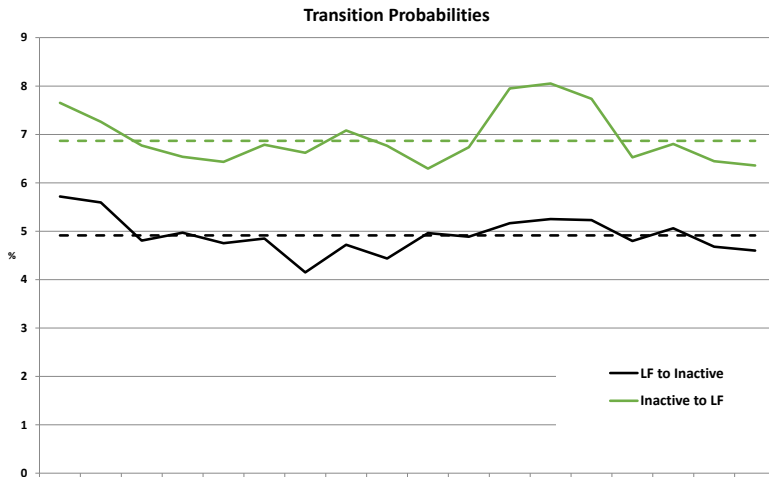
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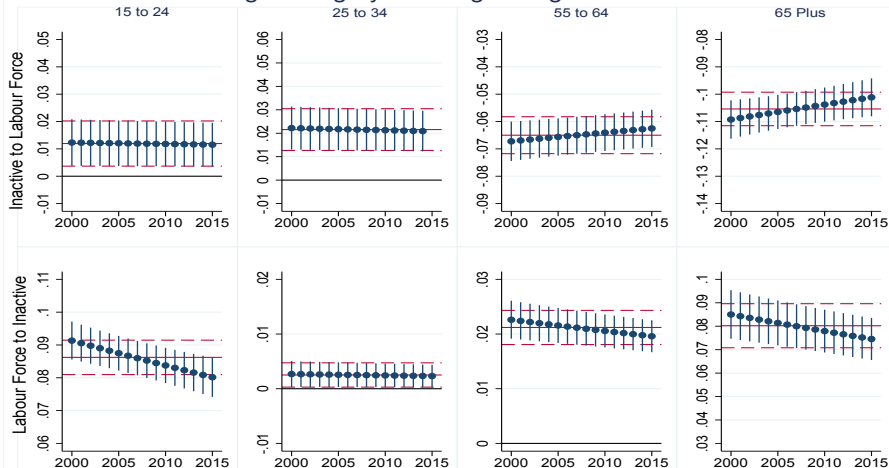
Transition Probabilities In/Out of the Labour Force





Average Marginal Effects at Different Points in the Cycle - Age Categories

Age Category - Average Marginal Effects





Average Marginal Effects at Different Points in the Cycle - Gender and Nationality

