



Economic outlook

Presentation to Budget Oversight Committee
Economic & Budget Division, Department of Finance
4 October 2016

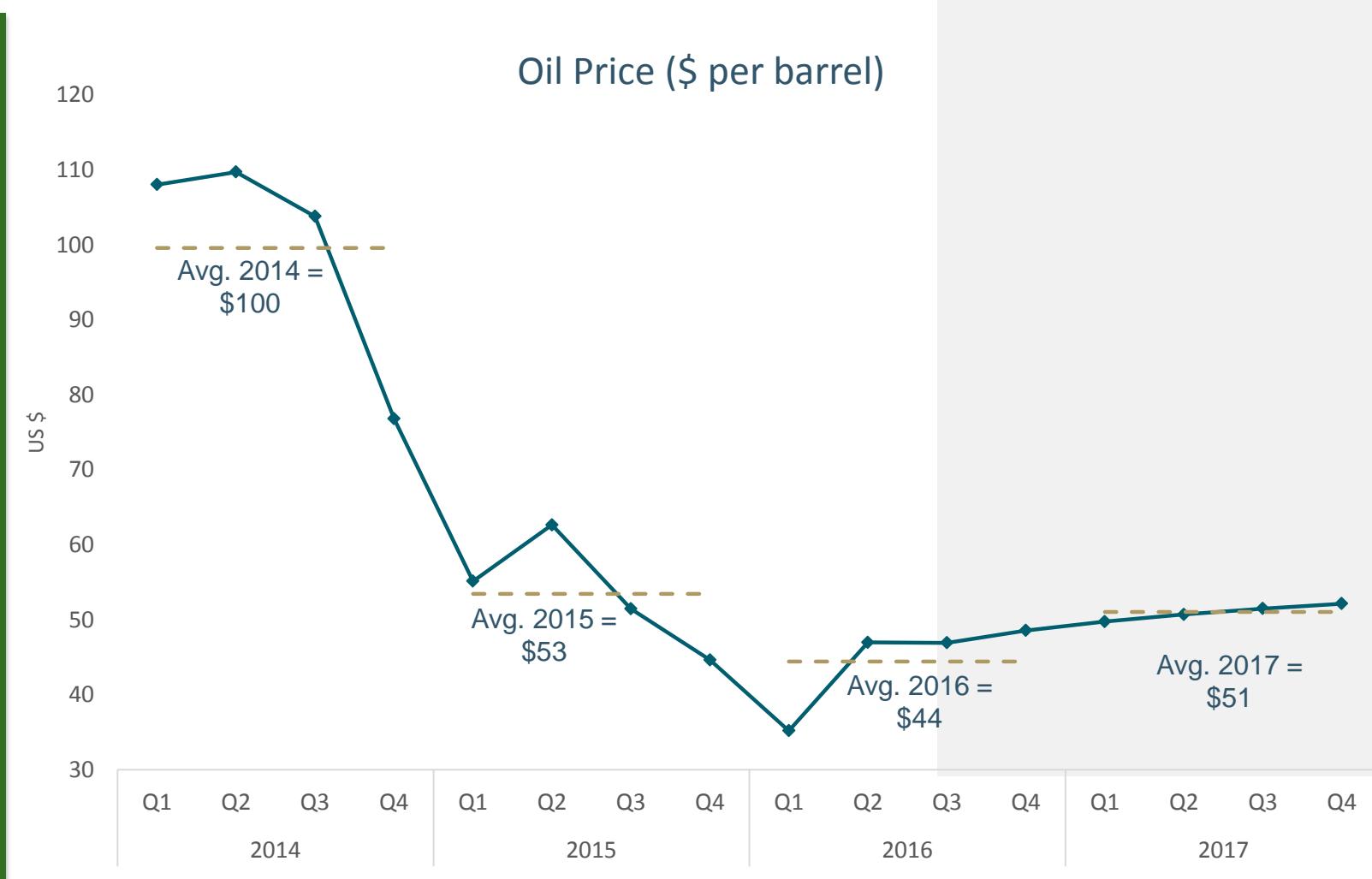


An Roinn Airgeadais
Department of Finance

External Assumptions

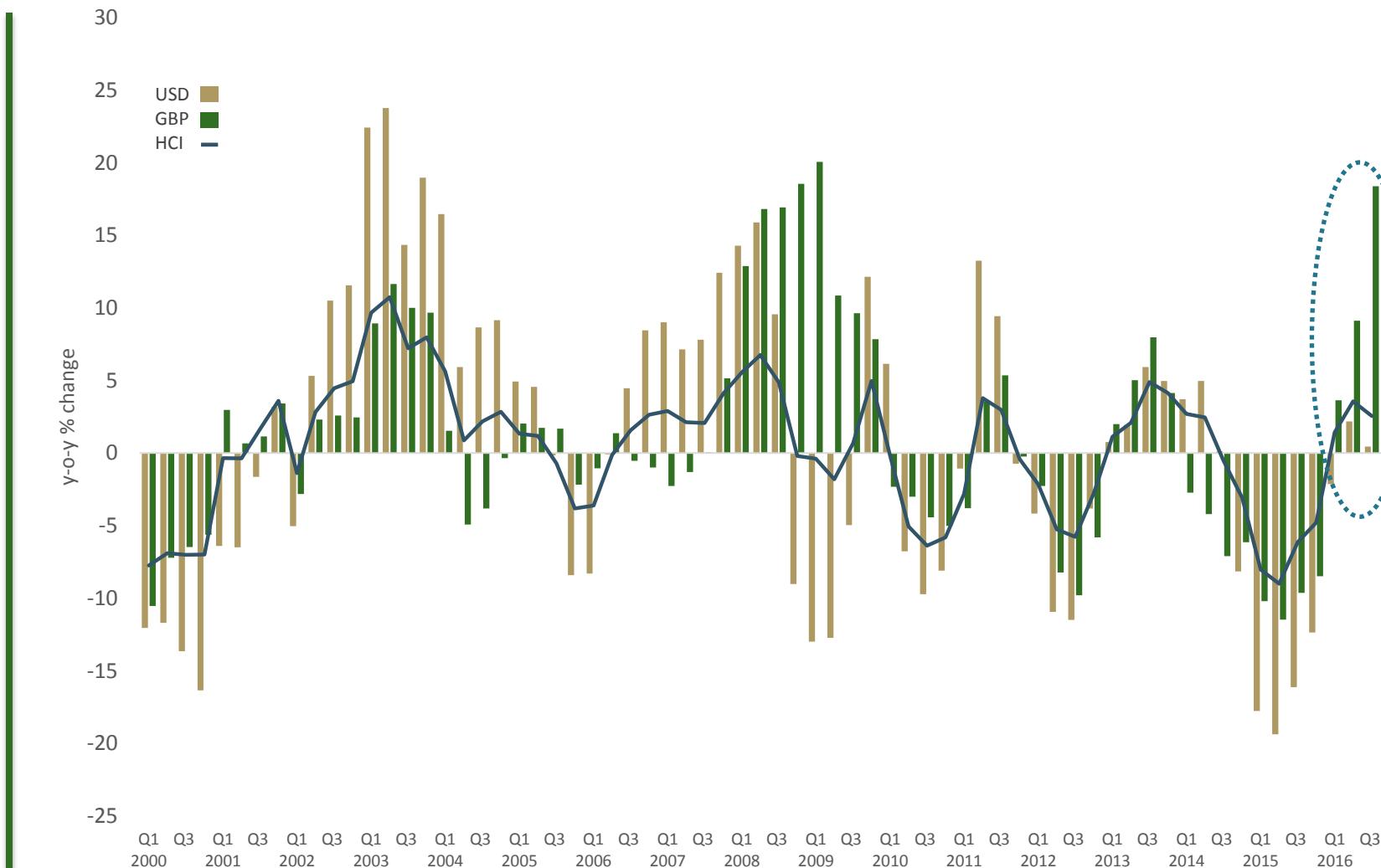


Commodity prices have started to recover very gradually ...





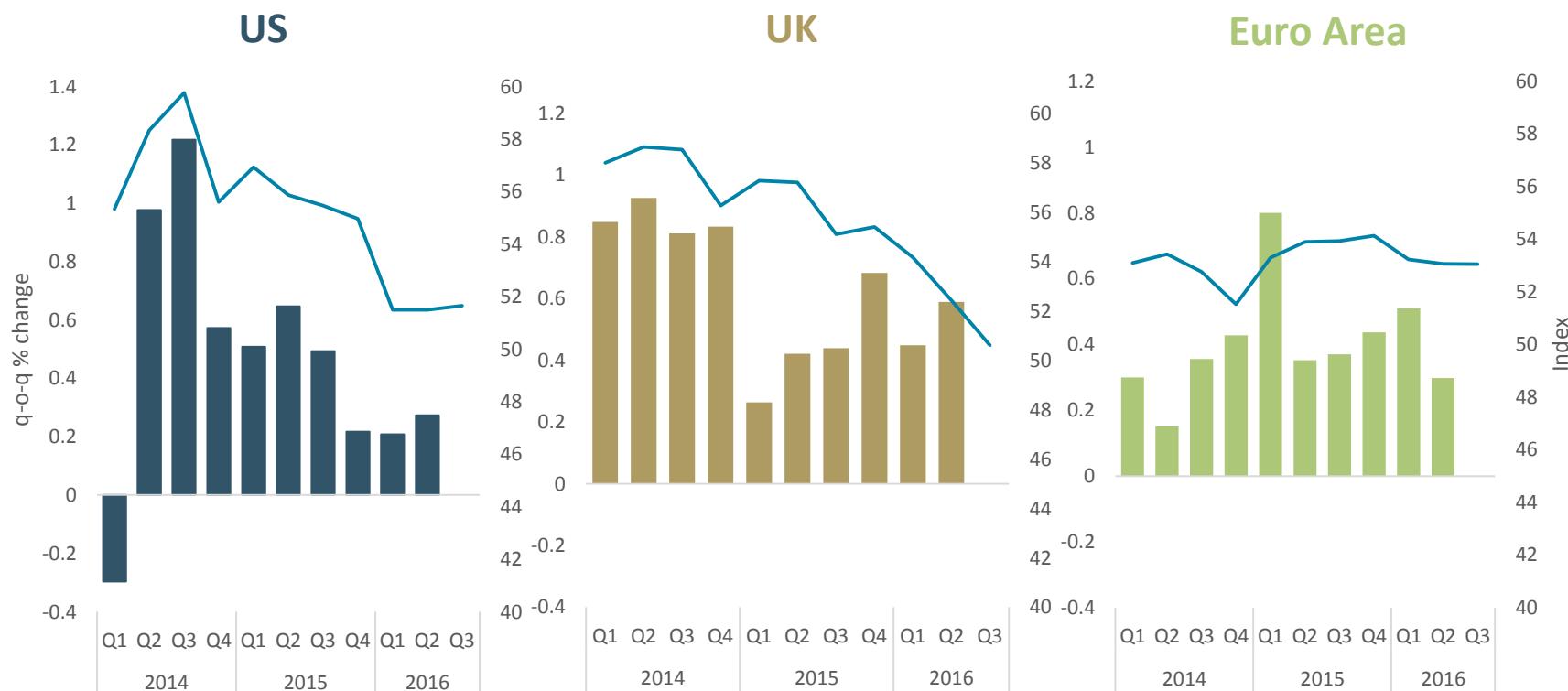
Appreciation in trade-weighted value of the euro over 2016...





Economic growth in Ireland's key trading partners slowing...

■ US GDP (left) ■ UK GDP (left) ■ EA GDP (left) — Composite PMI (right)



Sources:

1. GDP: US: Bureau of Economic Analysis; UK: Office for National Statistics; Euro Area: Eurostat
2. PMI: Markit

External assumptions...

	2015	2016 ^f	2017 ^f
External GDP growth			
United Kingdom	2.2	1.8	1.1
Euro Area	2.0	1.7	1.5
United States	2.6	1.6	2.2
Technical Assumptions			
Euro-dollar exchange rate	1.11	1.12*	1.12*
Euro-sterling exchange rate	0.73	0.81*	0.85*
Brent crude (dollars per barrel)	53	44	51

f: forecast value

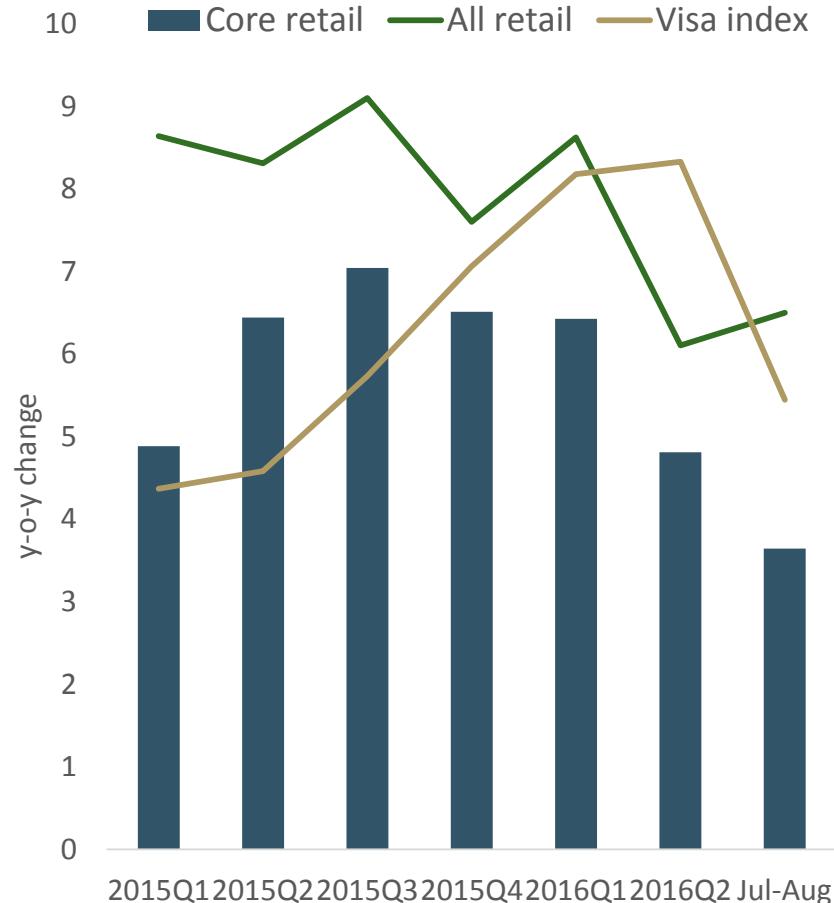
** fixed at mid-September: annual average*

Short-run economic outlook

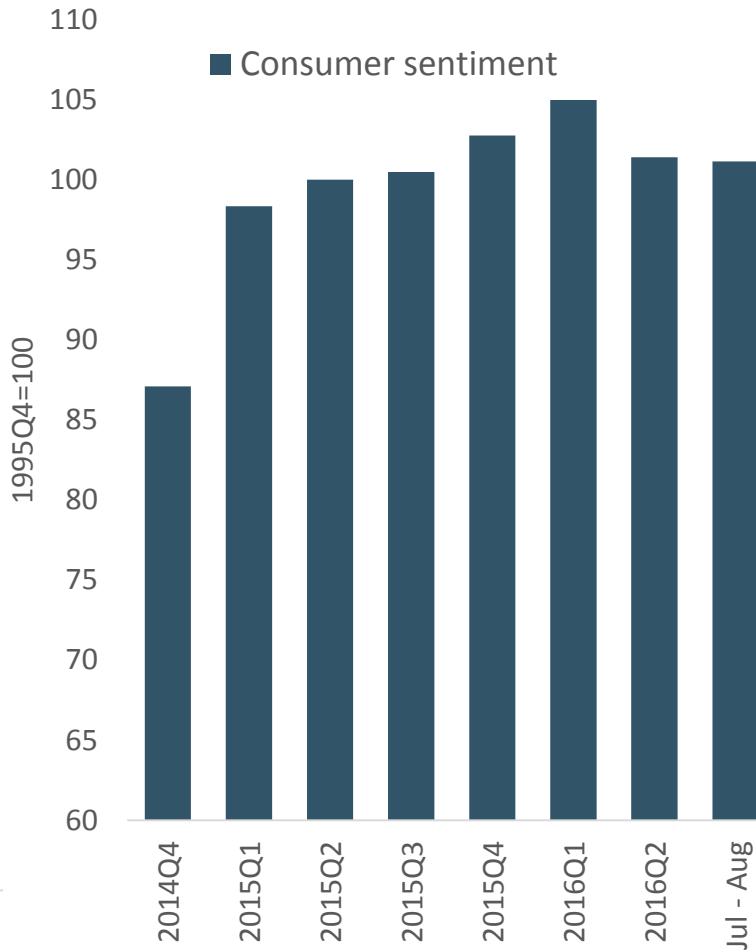
Headline GDP inflated by activities in the multinational sector...

- 2015: 26%
 - Small number of large multinational firms
 - Exceptional factors
 - Limited impact on actual activity in the Irish economy
- The main channels through which these factors affect Irish GDP figures include:
 - Contract manufacturing
 - Balance sheet relocations
 - An increase in new aircraft imports to Ireland for international leasing activities generating substantial fee income without significant employment effects;
- Headline GDP figures clearly distorted and are exaggerated in an Irish context
- Underlying economic activity remains strong
- The figures published by the CSO are compiled in accordance with best international practice and statistical standards

Consumer spending robust in the first half of 2016...



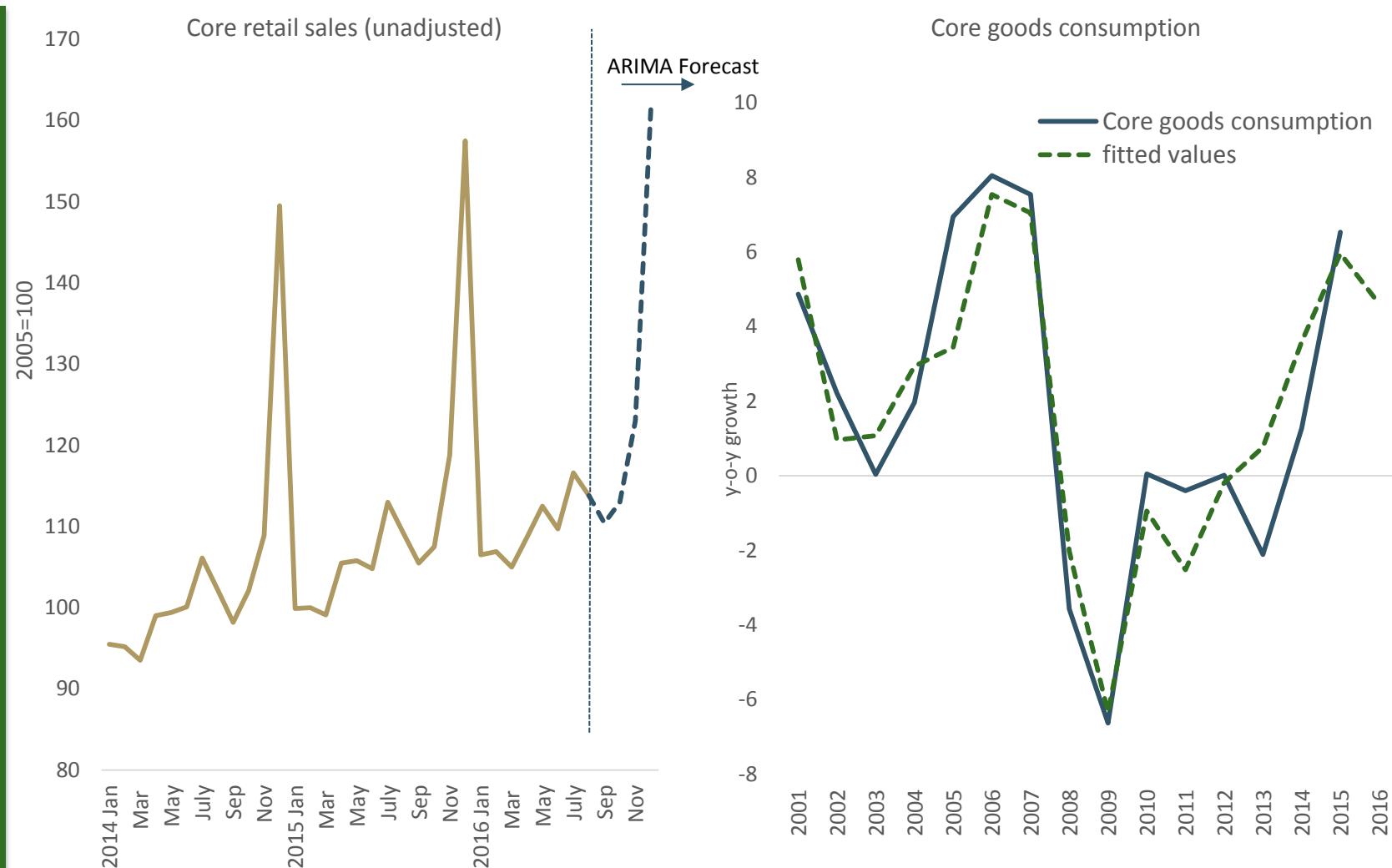
Source: CSO, VISA/Markit



Source: ESRI-KBC Bank

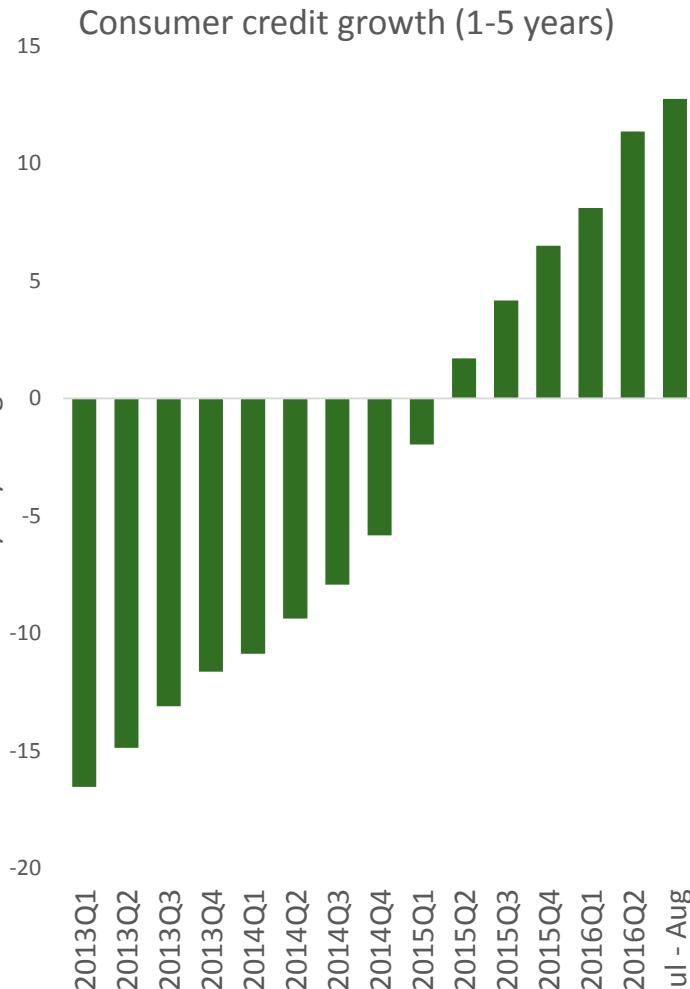
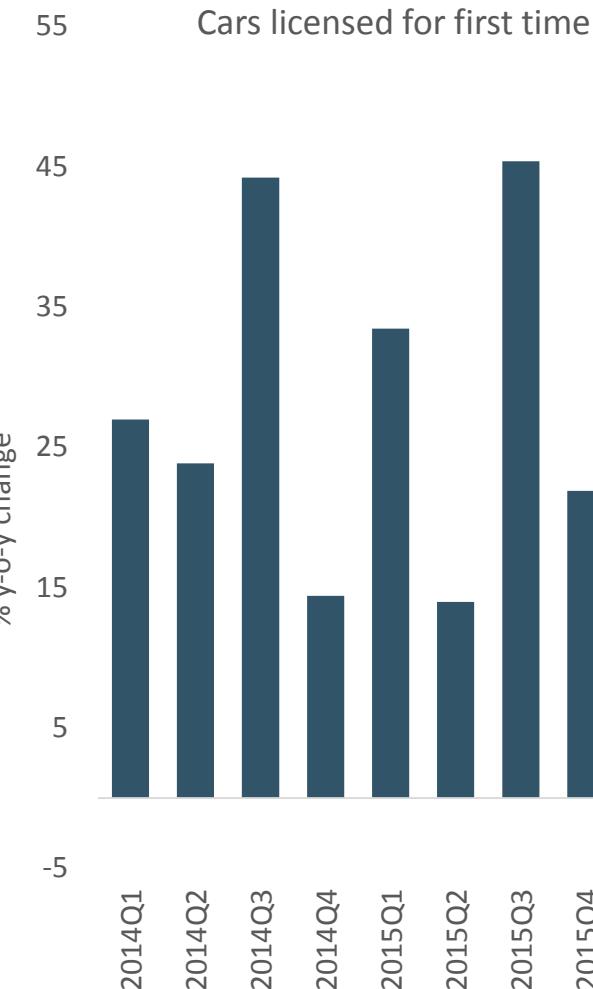


Core goods consumption...





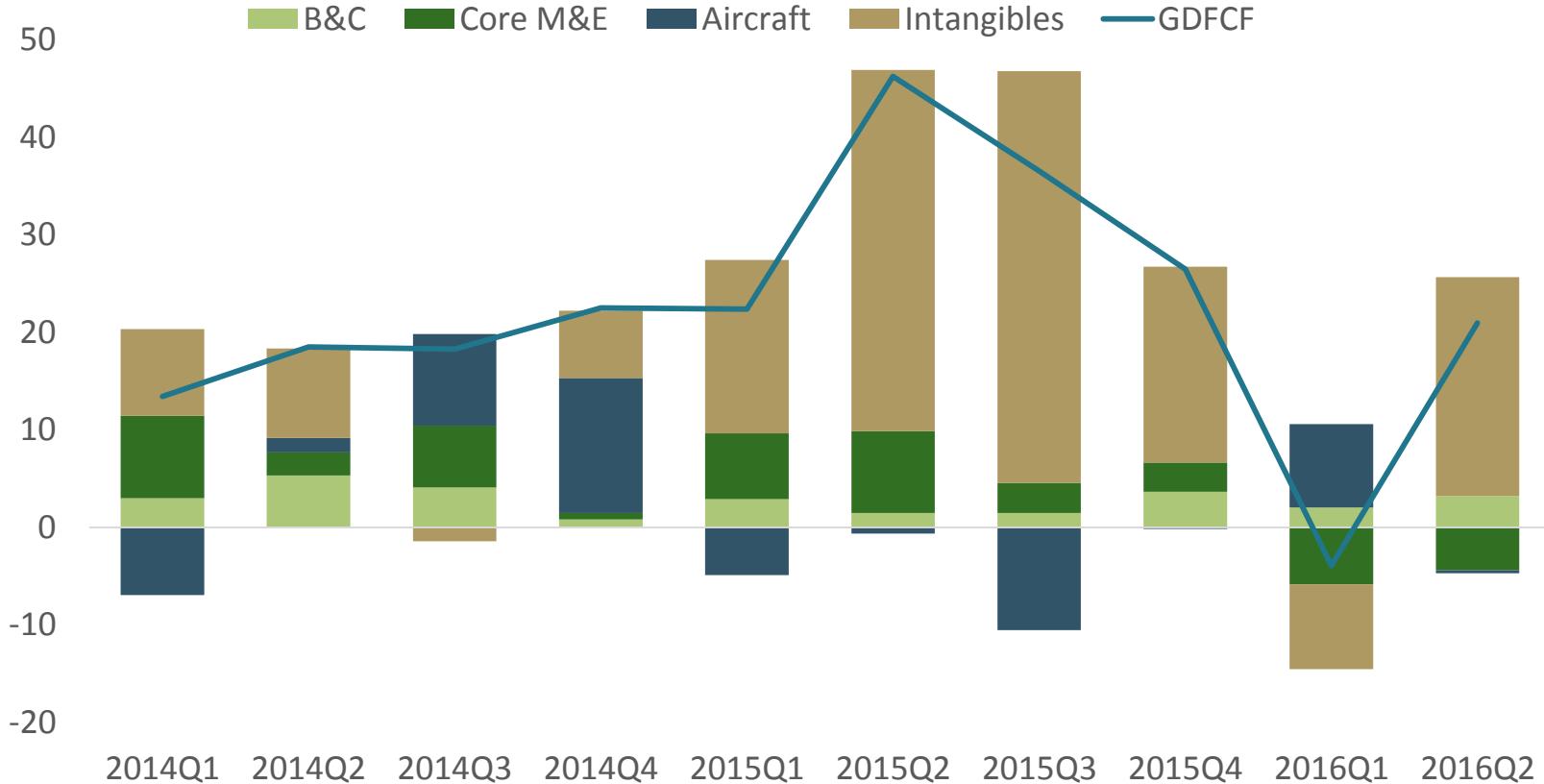
Car sales supported by pick up in medium-term consumer credit...





Investment cycle has led domestic recovery...

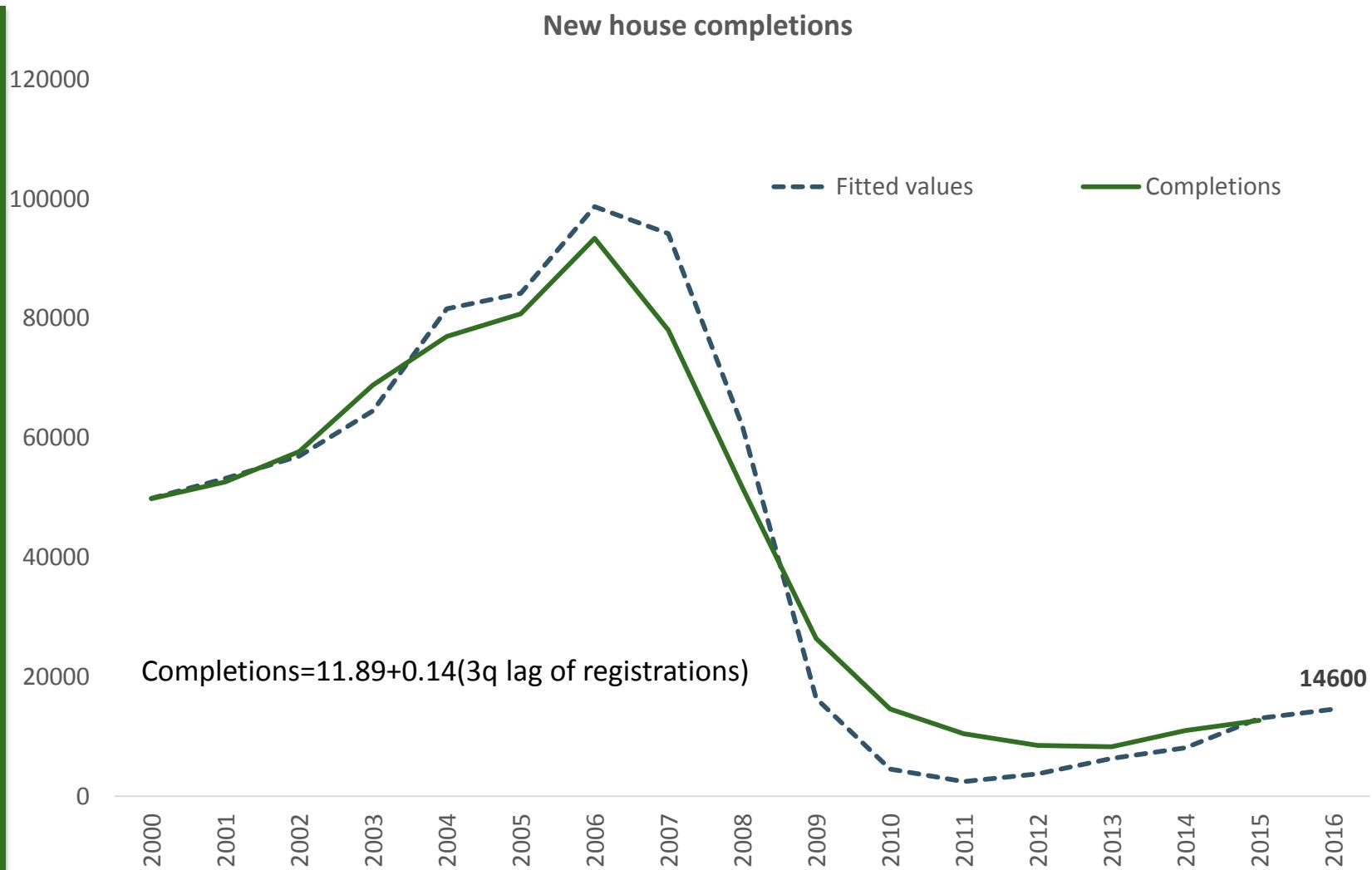
Contributions to Investment, pp



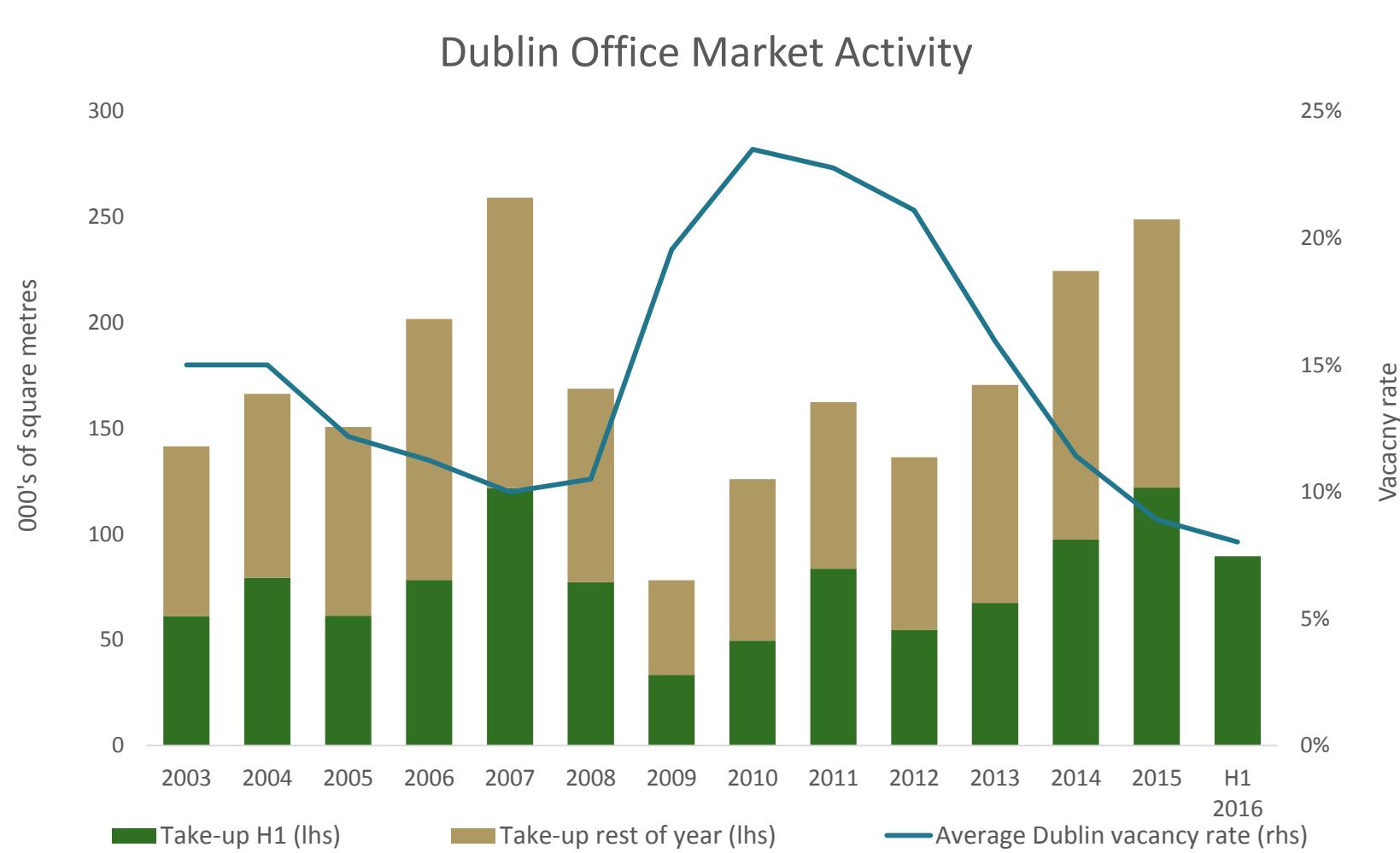
Source: CSO



Investment – Building and Construction...



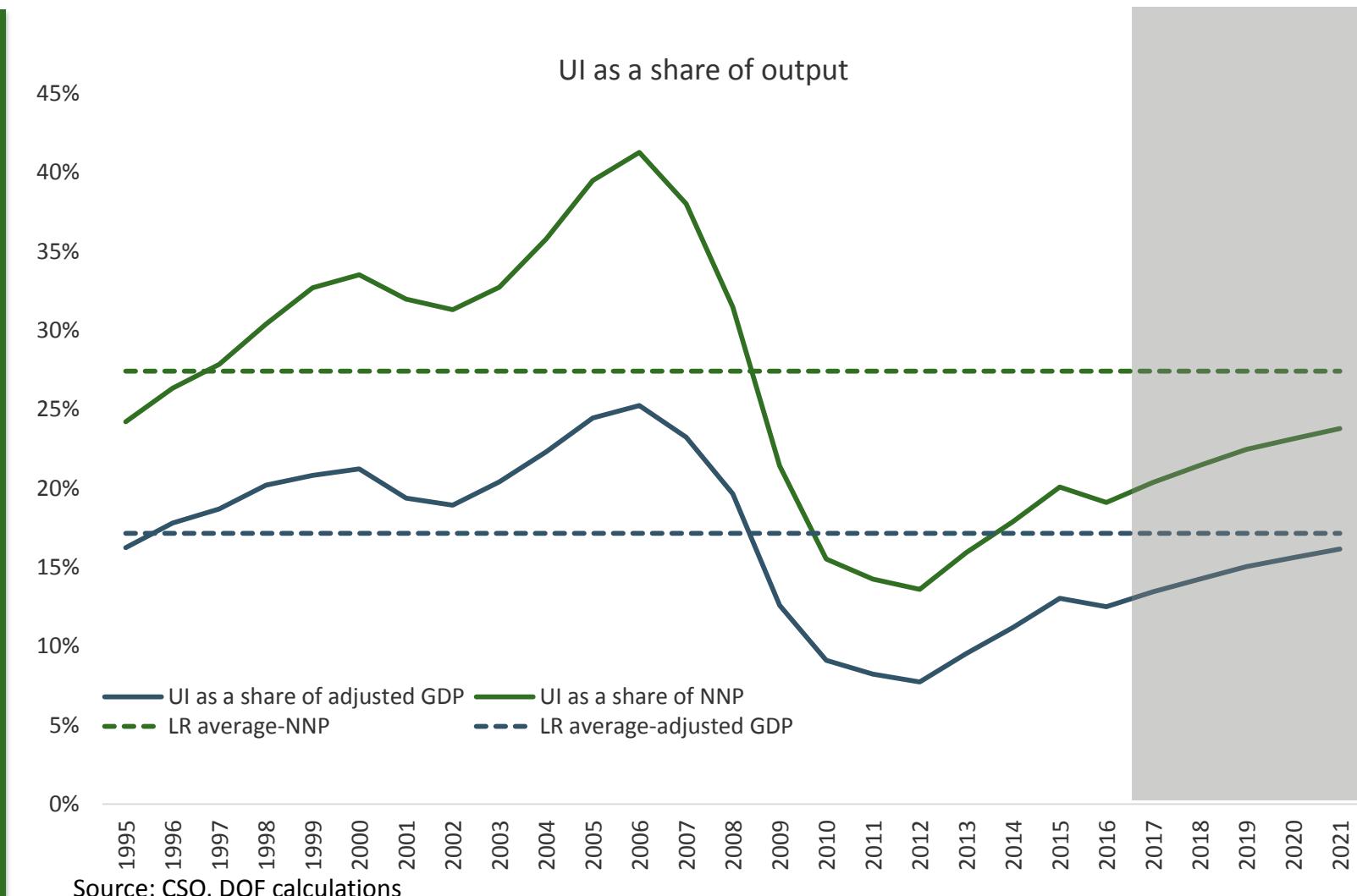
Commercial vacancy rate now very low...



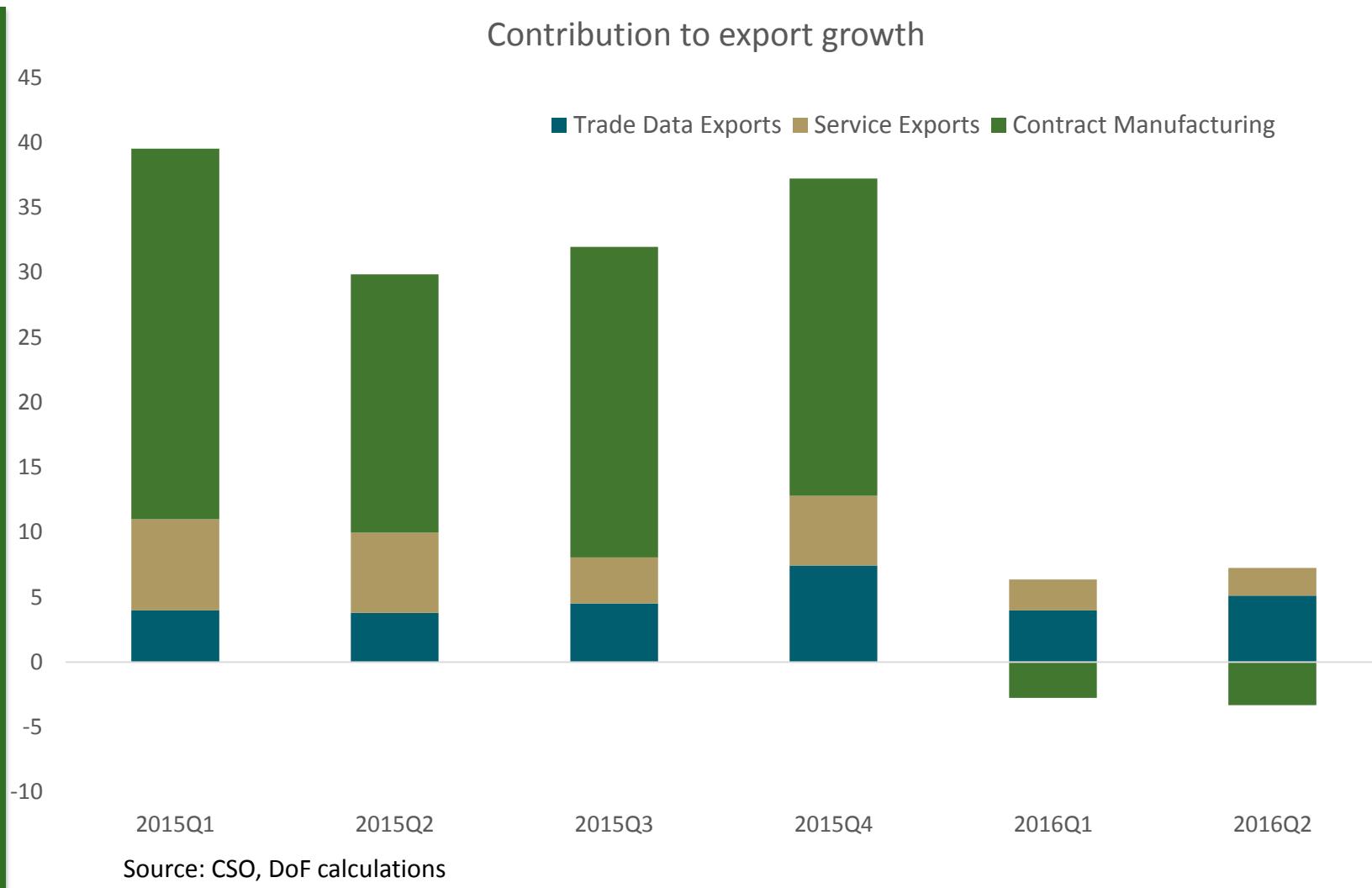
Source: CBRE



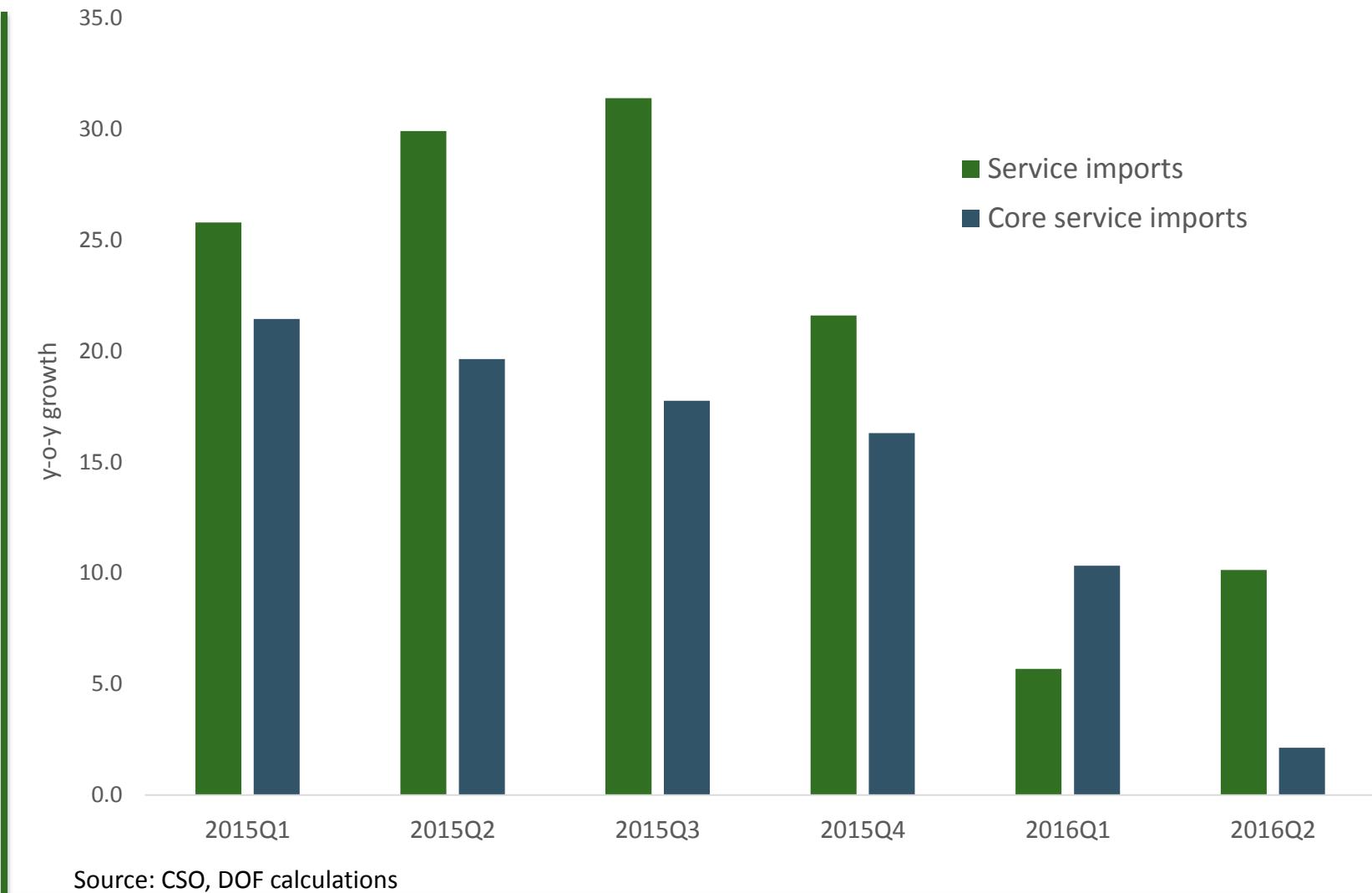
Underlying investment converging towards its LR average...



Underlying exports remain strong in H1...

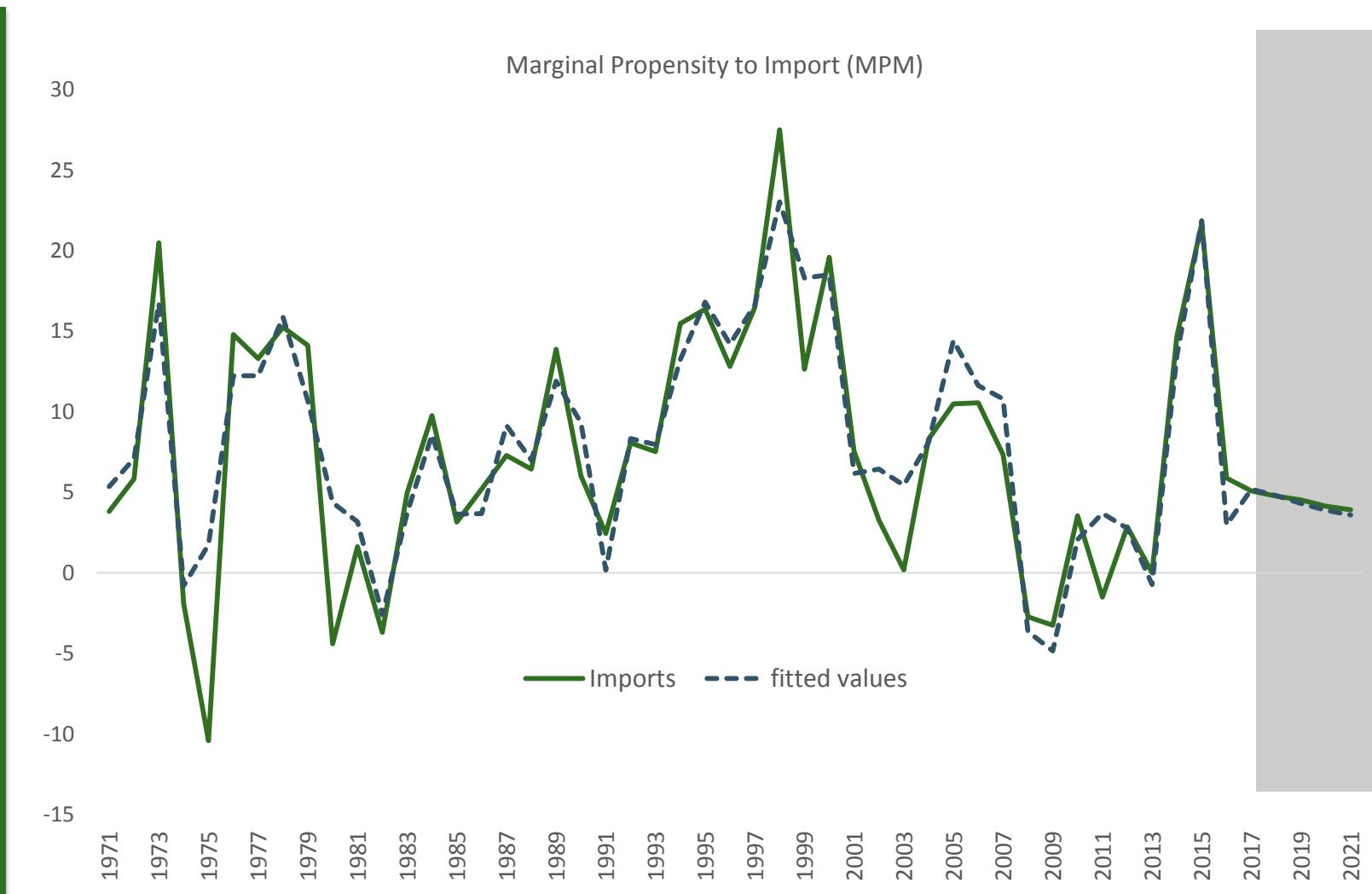


Slowdown in underlying service imports...

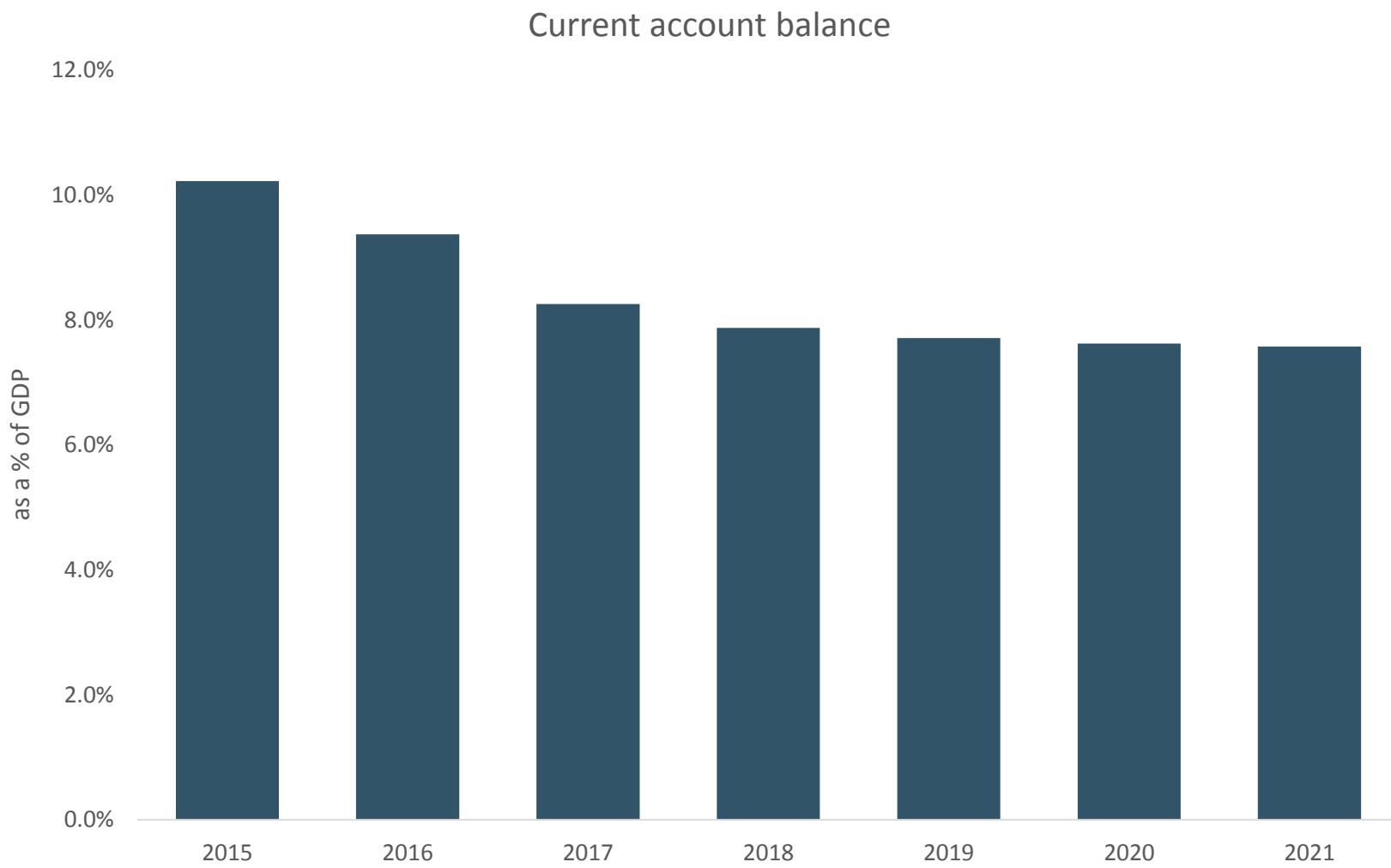




Imports...

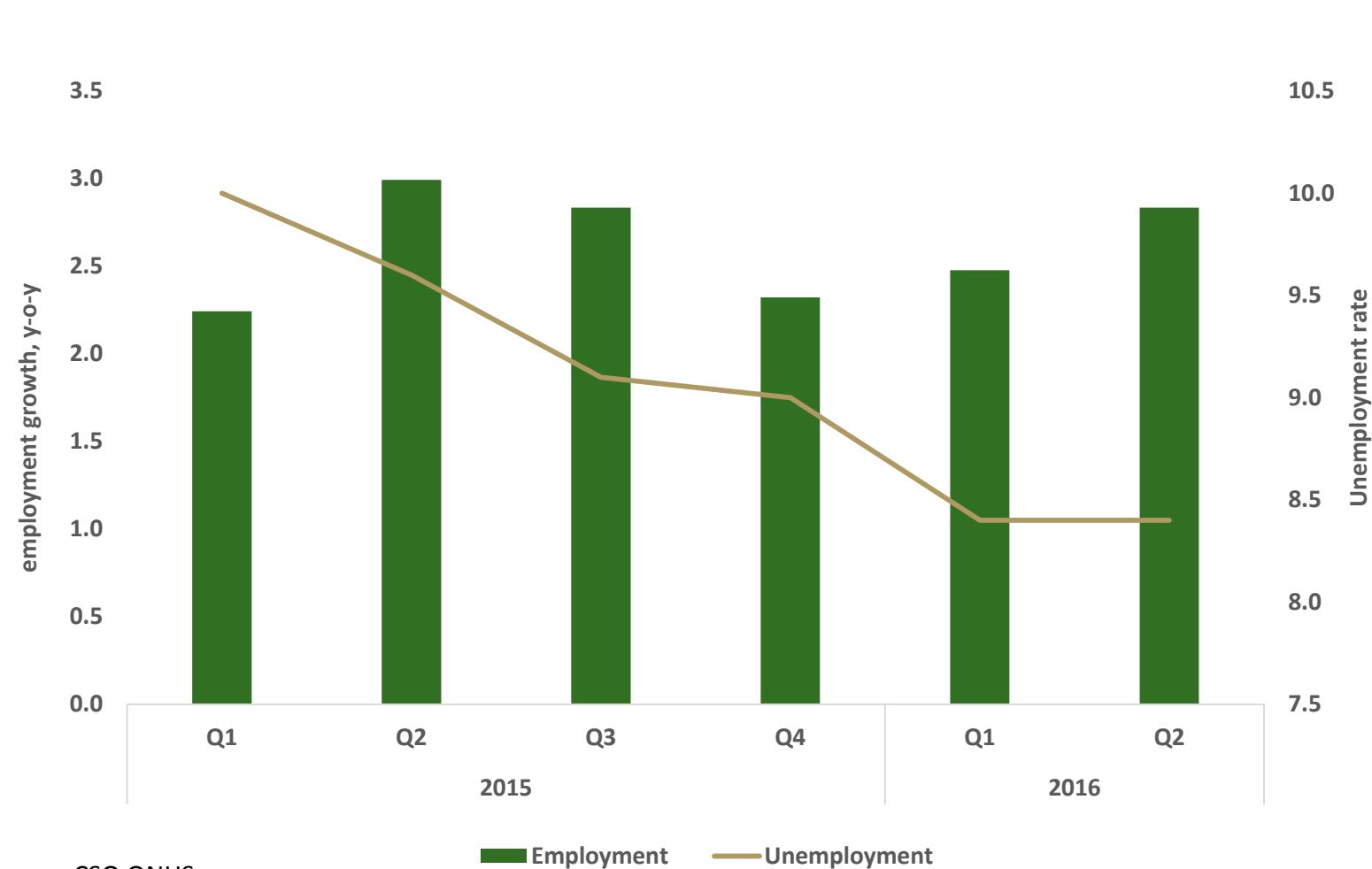


External deleveraging continues at a slower pace...



Labour Market

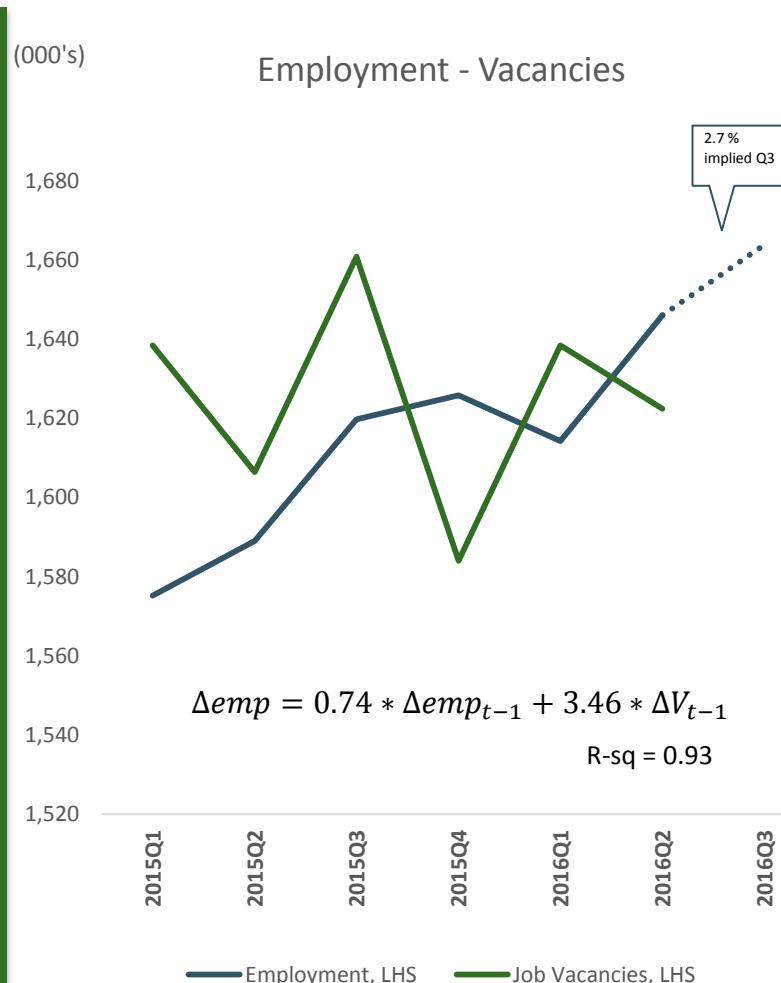
Highest employment volumes since 2009...



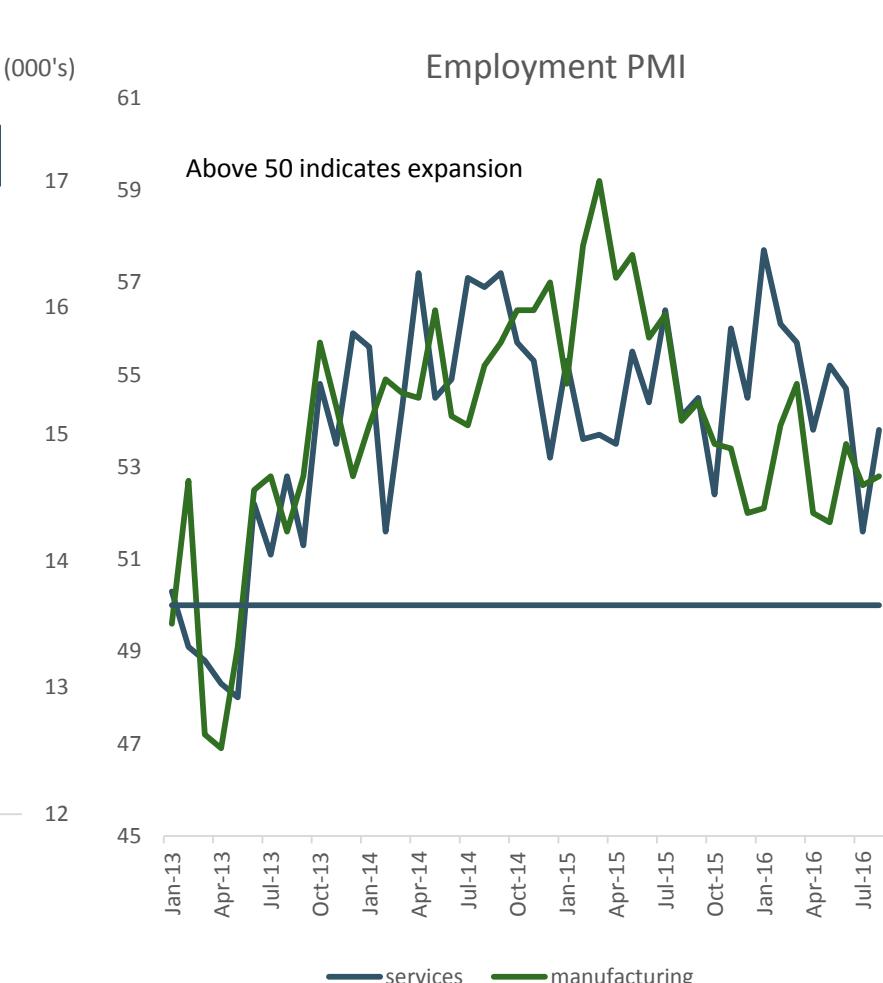
Source: CSO QNHS



'Soft' data suggest sustained momentum...

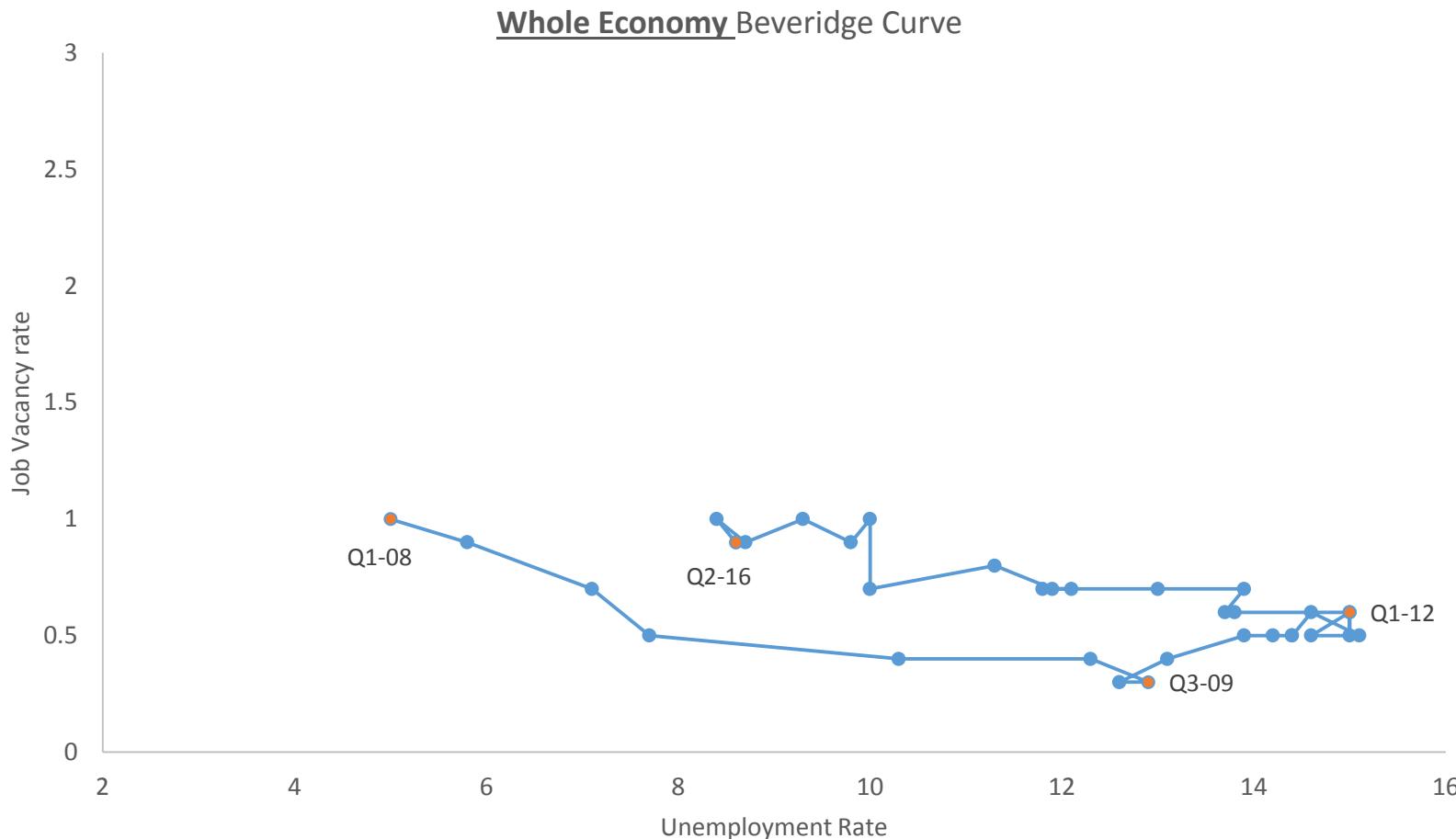


Source: CSO EHECS Table EHQ16 vacancies data



Source: Investec

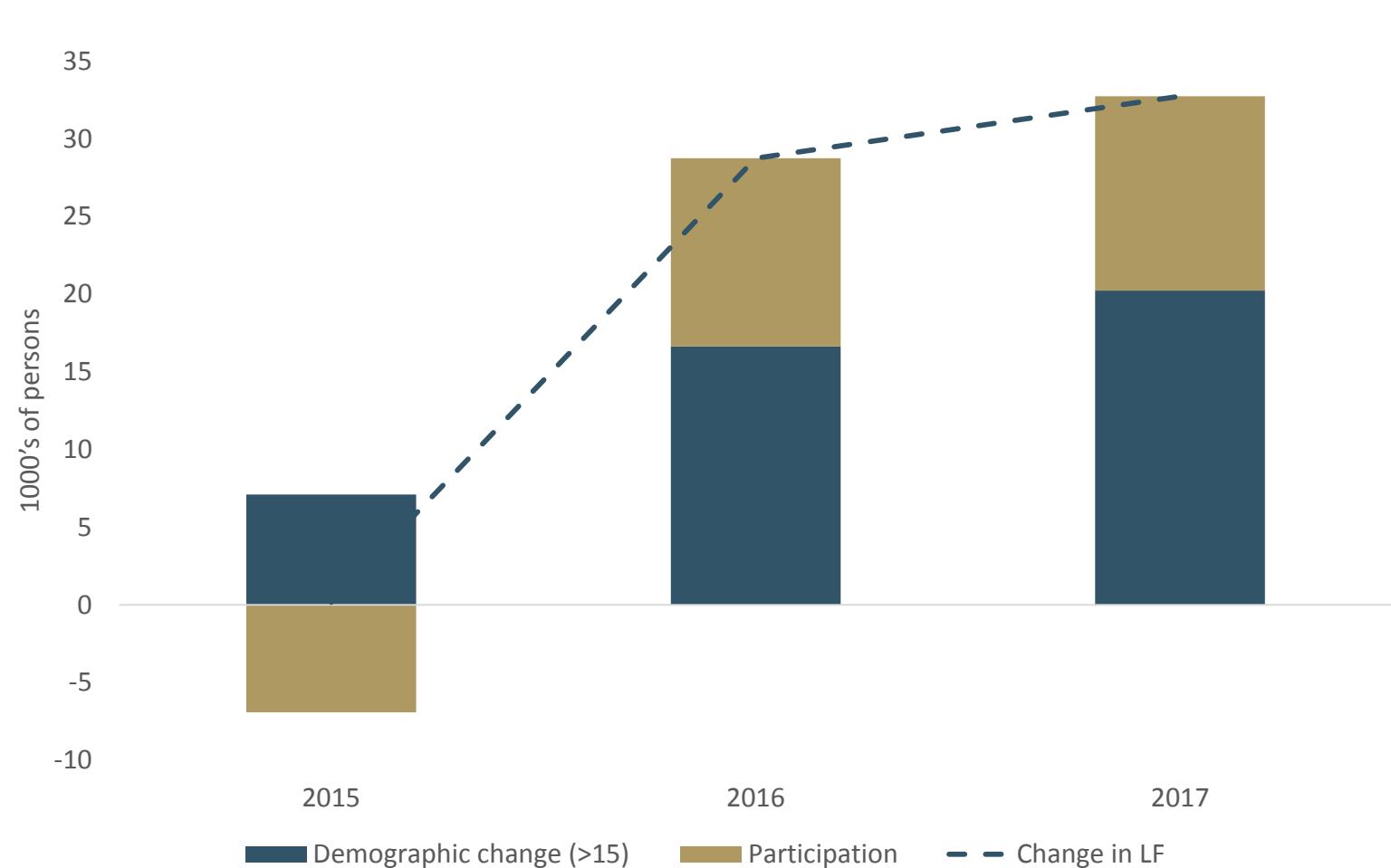
Retracting Beveridge Curve - improvement in labour matching...



Source: Department estimates based on CSO QNHS data to Q2 2016.

Note: Sectoral unemployment rates are proxied using data by last occupied sector.

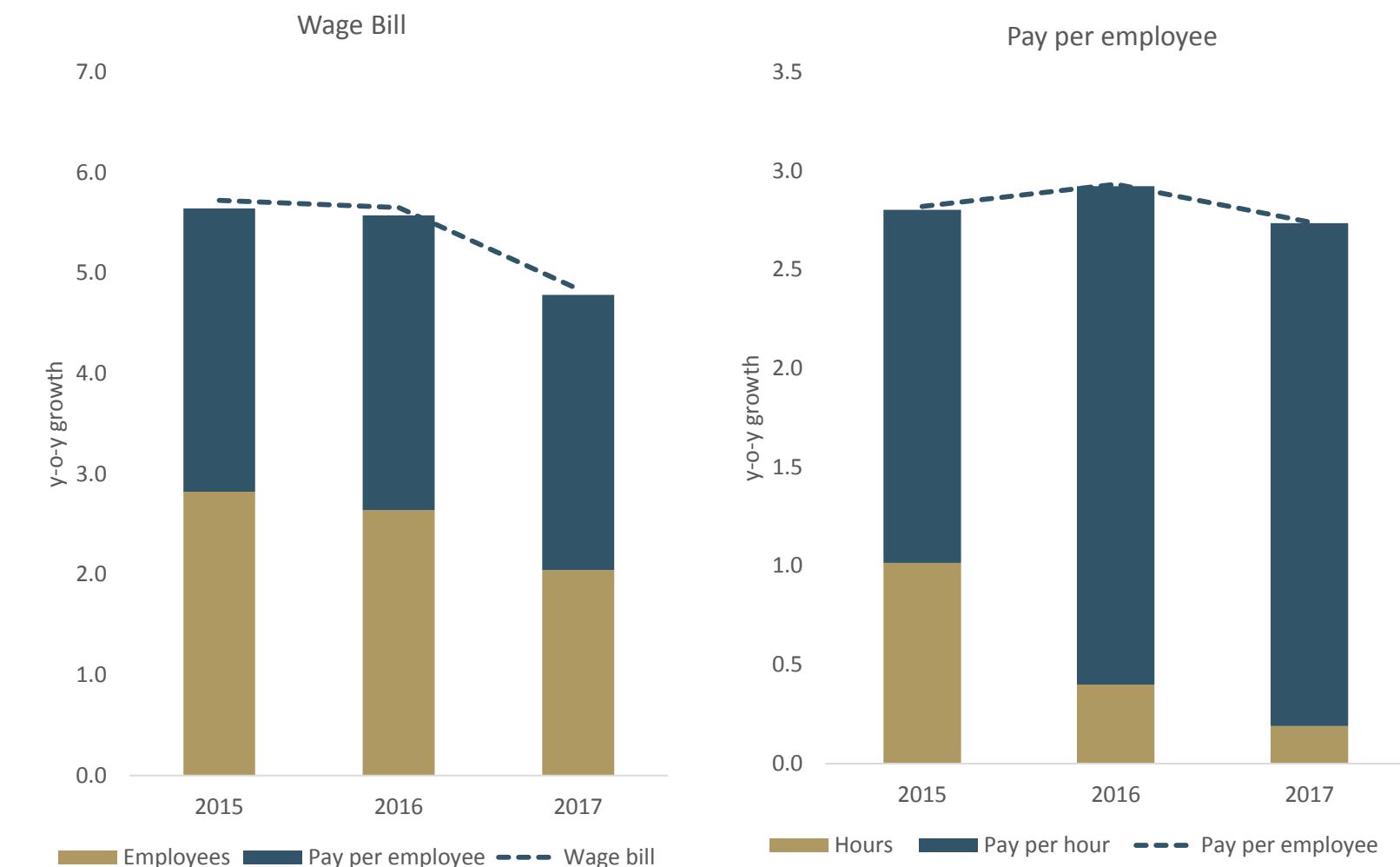
Labour force growth for the first time since 2013...



Note: Labour Force on a 15-74 basis

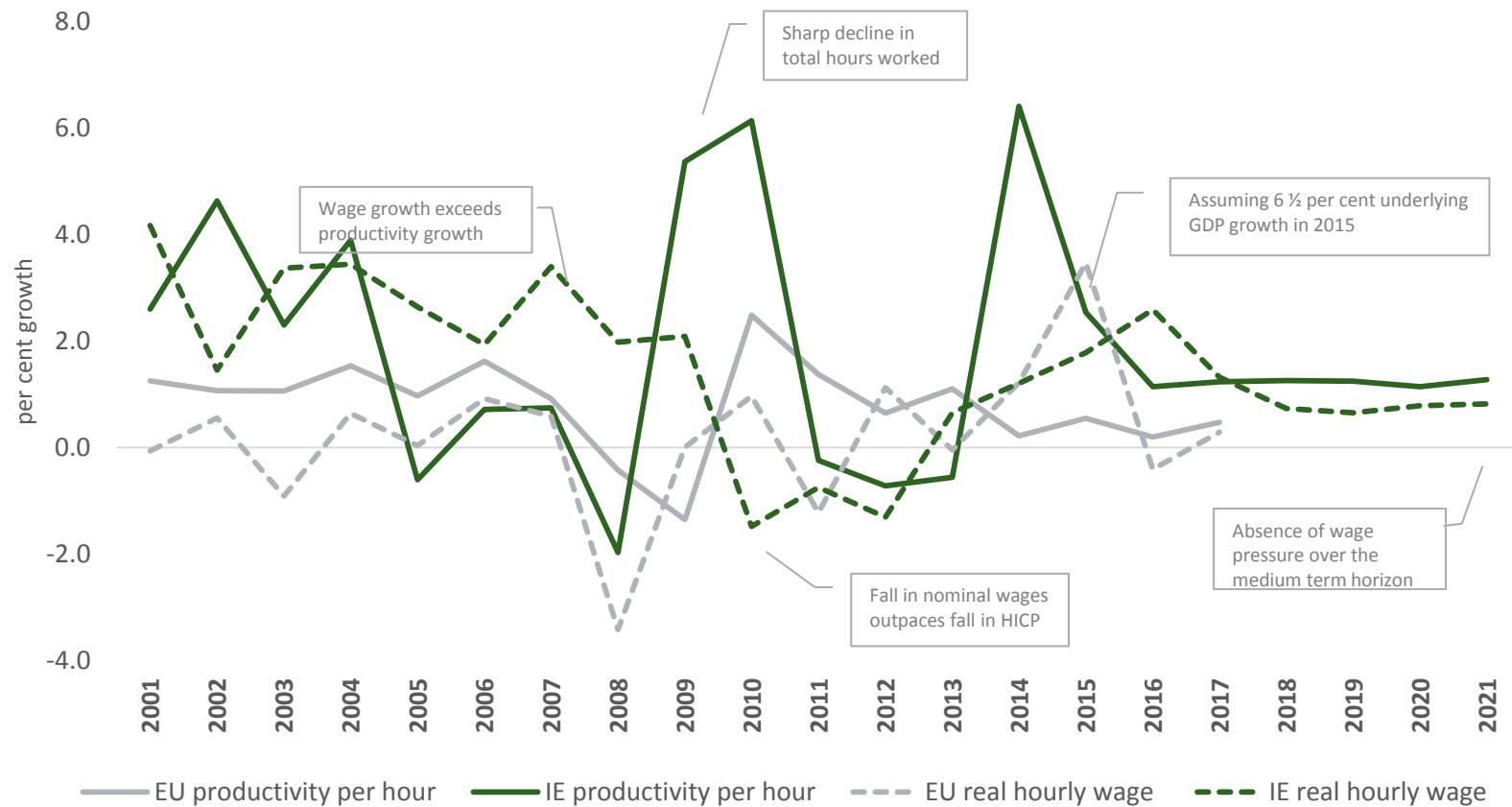


Budget 2017 near-term wage outlook





Labour market outlook consistent fundamentals

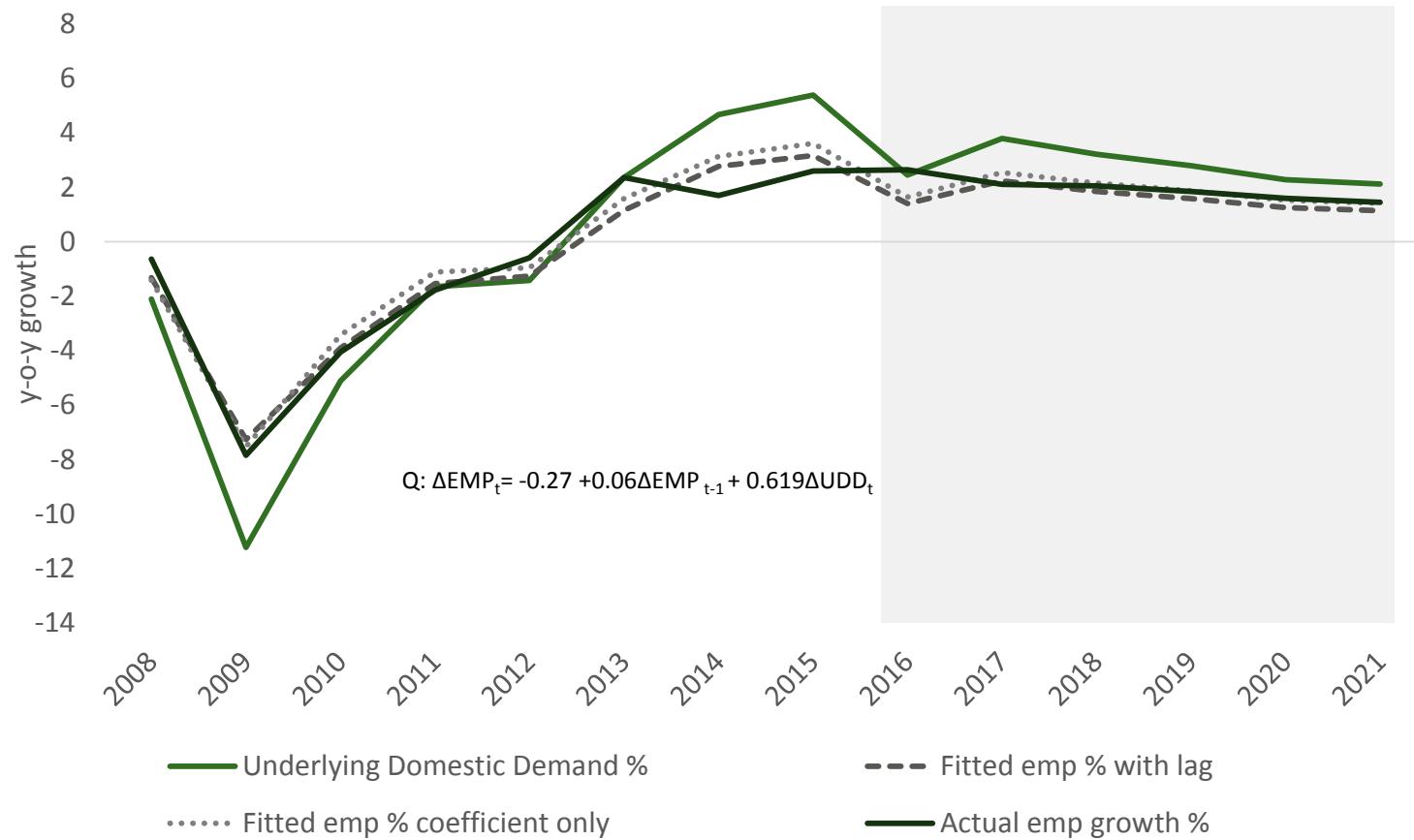


$$\text{Real wage} = \frac{\text{Nominal wage}}{\text{HICP Index level}}$$



Labour market outlook consistent fundamentals

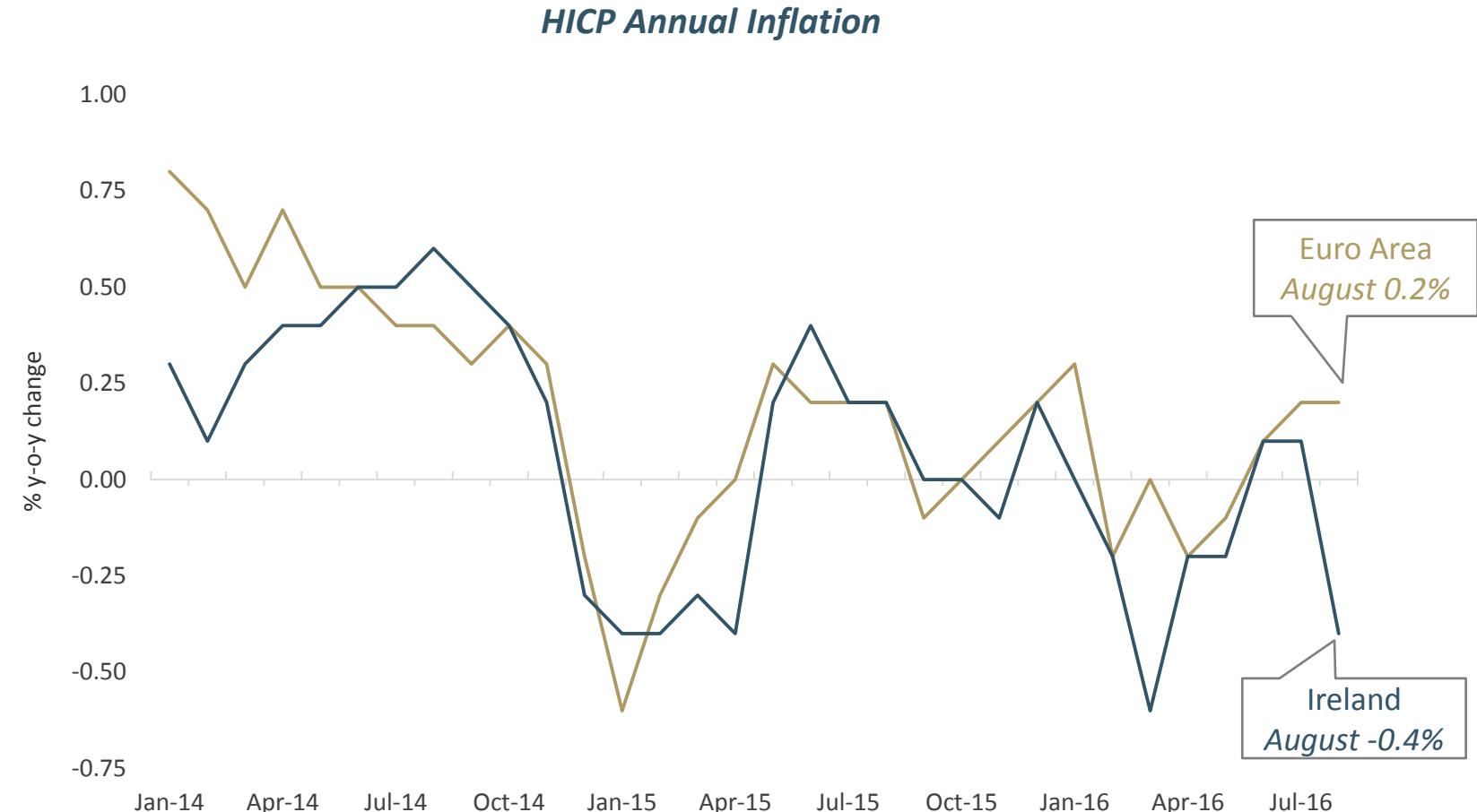
Employment aligned with underlying domestic demand (UDD)



Price Developments



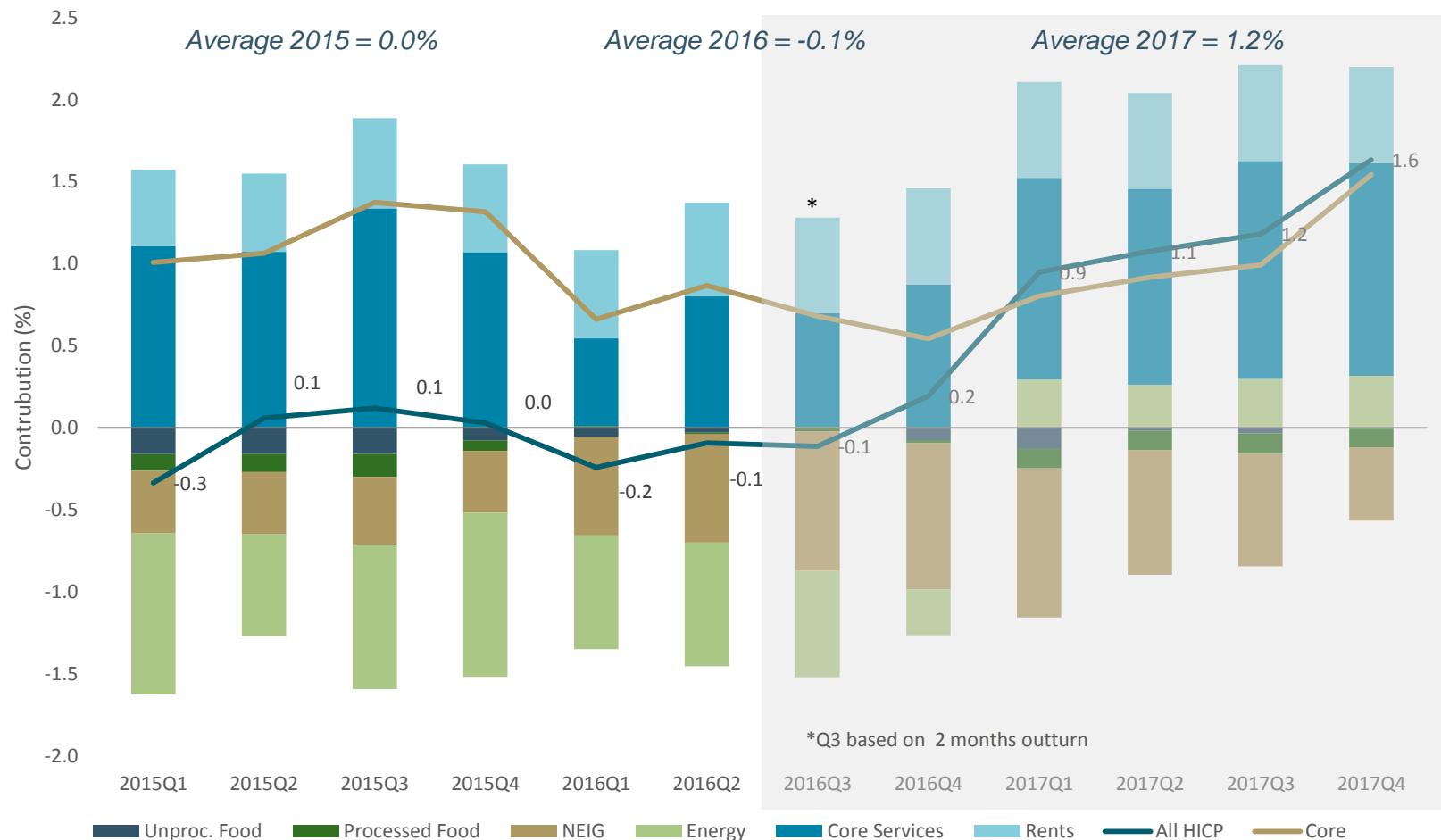
Price inflation continues to stay low (and slightly) below the euro area rate...





The drag on inflation from falling energy prices is starting to fade....

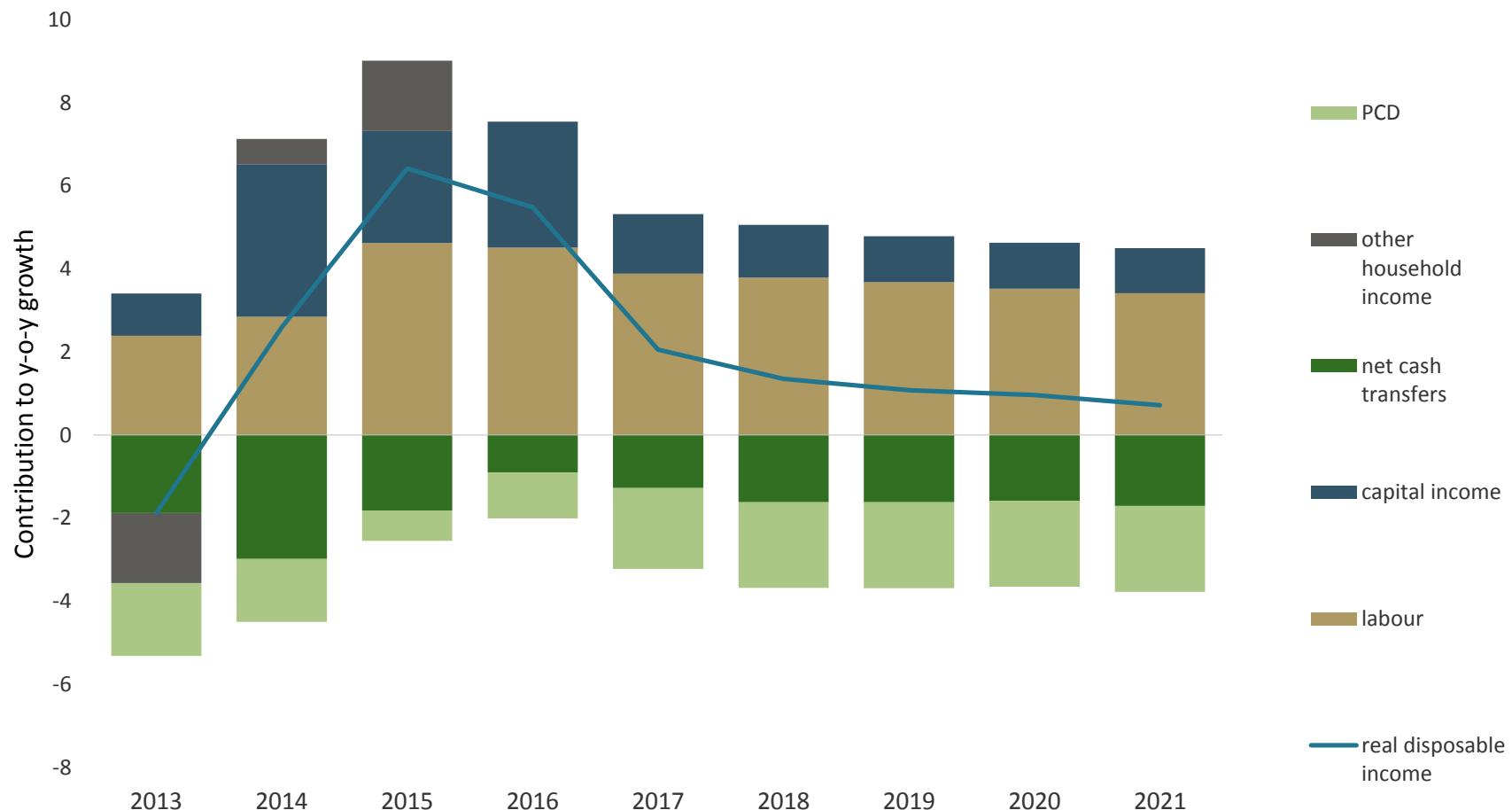
Headline vs Core HICP Inflation



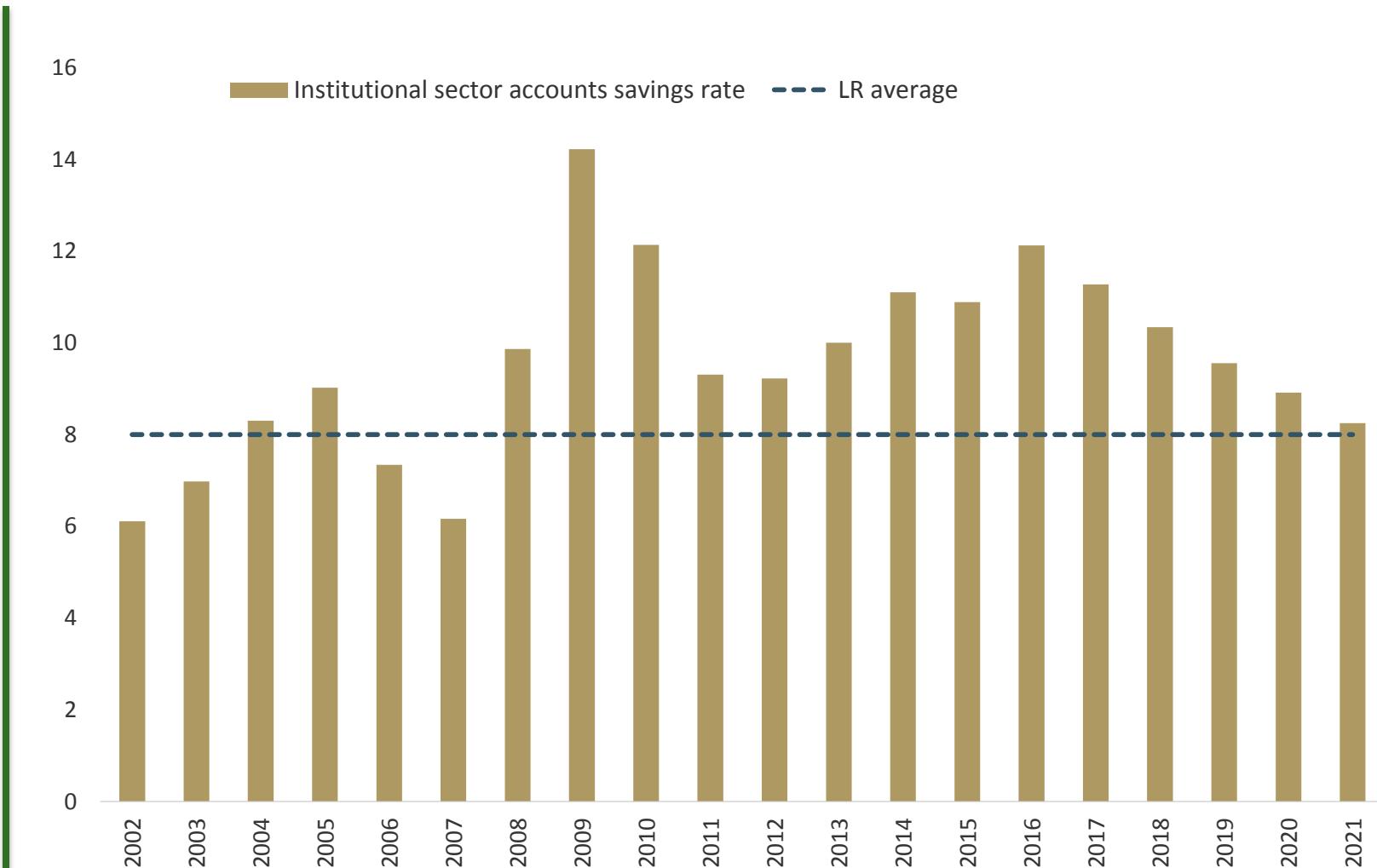
Household Income Developments

Household income...

Change in real personal disposable income



Household deleveraging continues at slower pace...



Macroeconomic outlook

Budget 2017- Macroeconomic Outlook...

Year-on-year % change	2015	2016	2017	2018	2019	2020	2021
GDP	26.3	4.2	3.5	3.4	3.2	2.8	2.6
GNP	18.7	7.5	3.3	3.2	3.0	2.6	2.4
Nominal GDP	32.4	2.8	4.5	4.6	4.5	4.2	4.1
Personal Consumption	4.5	3.2	2.8	2.2	1.8	1.5	1.3
Govt Consumption	1.1	5.9	2.4	1.3	1.0	0.9	0.9
Investment	32.7	15.8	6.0	4.7	4.3	3.5	3.4
Exports	34.4	3.6	4.5	4.8	4.7	4.2	4.0
Imports	21.7	5.9	5.1	4.8	4.5	4.1	3.9
HICP	0.0	-0.1	1.2	1.8	1.9	1.9	1.9
GDP Deflator	4.9	-1.3	1.0	1.1	1.2	1.4	1.5
Employment	2.6	2.6	2.1	2.1	1.8	1.6	1.4
Unemployment (rate)	9.5	8.3	7.8	7.3	6.9	6.6	6.2
Contributions to growth (p.p)*							
Domestic Demand	8.9	5.1	2.7	2.1	1.9	1.6	1.5
Change in Stocks	-0.8	0.1	0.0	0.0	0.0	0.0	0.0
Net Exports	18.3	-1.0	0.8	1.3	1.4	1.2	1.2
Underlying Domestic Demand	2.9	1.5	2.2	1.9	1.6	1.3	1.2
Underlying Net Exports	23.5	2.7	1.3	1.6	1.6	1.4	1.4

* Rounding may affect totals



Short-term risks – tilted to the downside, mainly external...

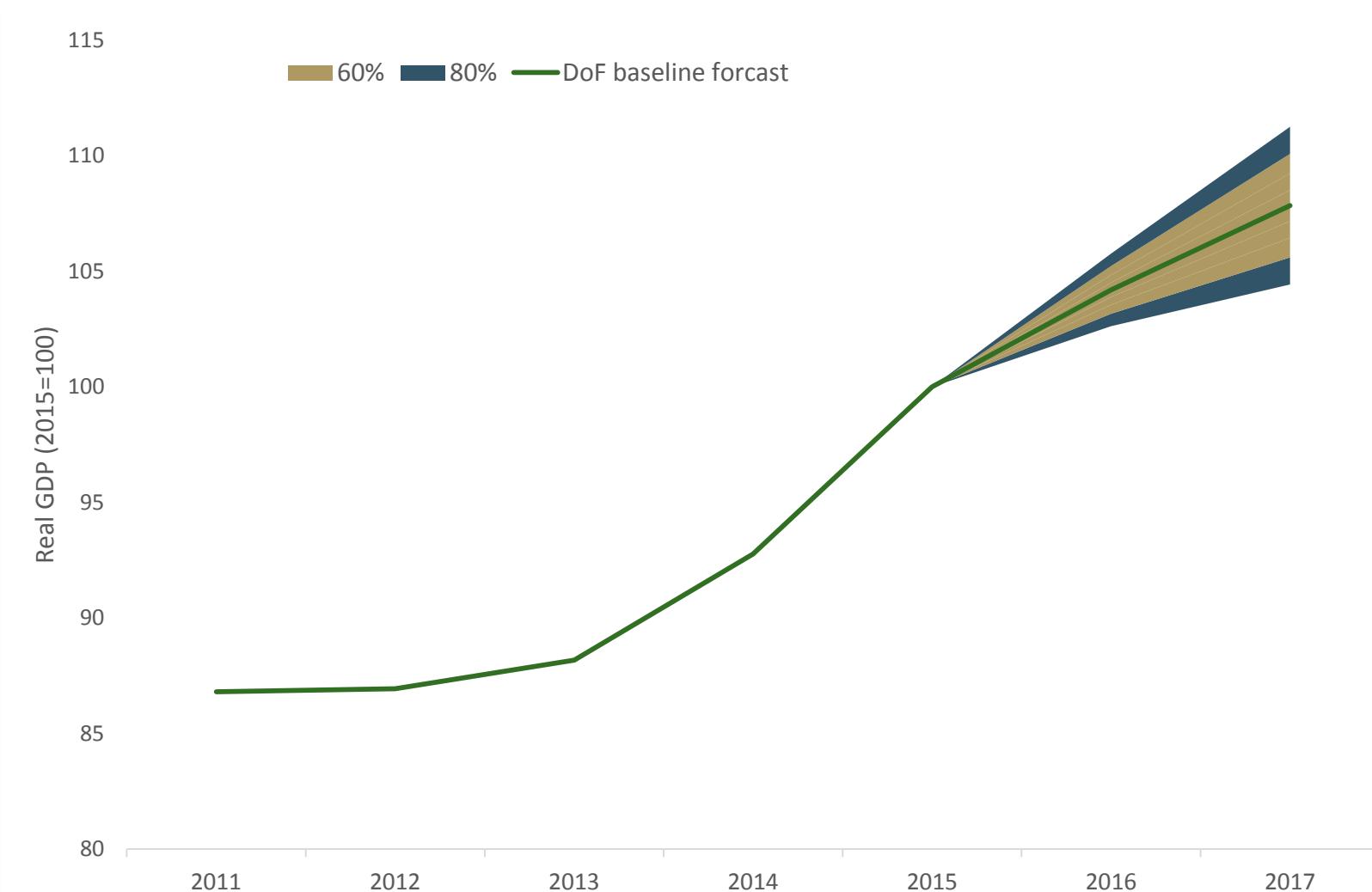
External

- Brexit
 - Exchange rate developments
 - Bilateral trade flows and impacts of lower UK output (medium term)
- Slowdown in world growth
 - Weak productivity
 - Ageing population
 - “Secular stagnation”
- Geopolitical risks

Domestic

- Further deleveraging
- Loss in competitiveness

Fan chart...



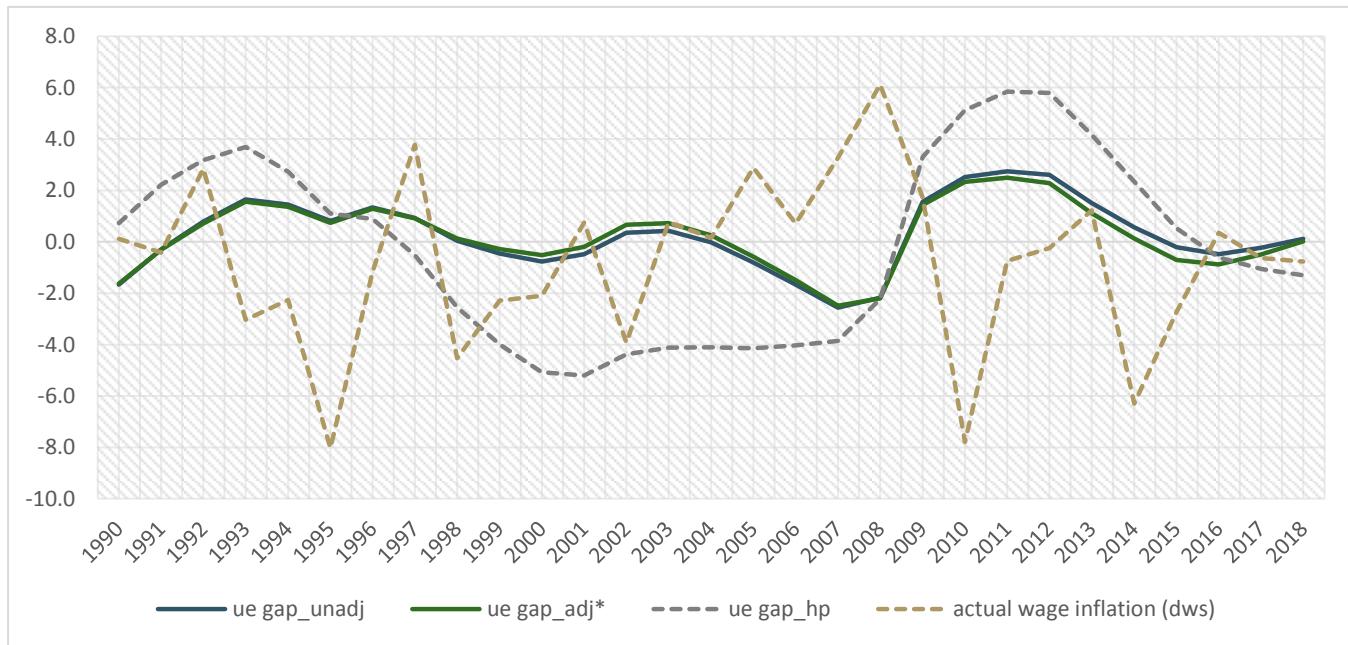
Annex: Supply-side

Application of harmonised methodology

Approach agreed with Commission and Council to incorporate NIE

- Adjustment to 2015 capital stock in line with CSO constant net capital stock figures(+54% growth)
- Perpetual inventory method (PIM) drives stock path over 2016-18
- Recalibration of TFP model (to BGAP45) incorporating a dummy from 2015 onwards to neutralise revision impacts on trend TFP projections.
- Preliminary TFP priors re-set in accordance w/ revised actual TFP path
- Use of dummies within Kalman to offset surge in real unit labour costs in 2015 (adjusted PC)

Adjustment to NAWRU model improves fit of wage inflation..



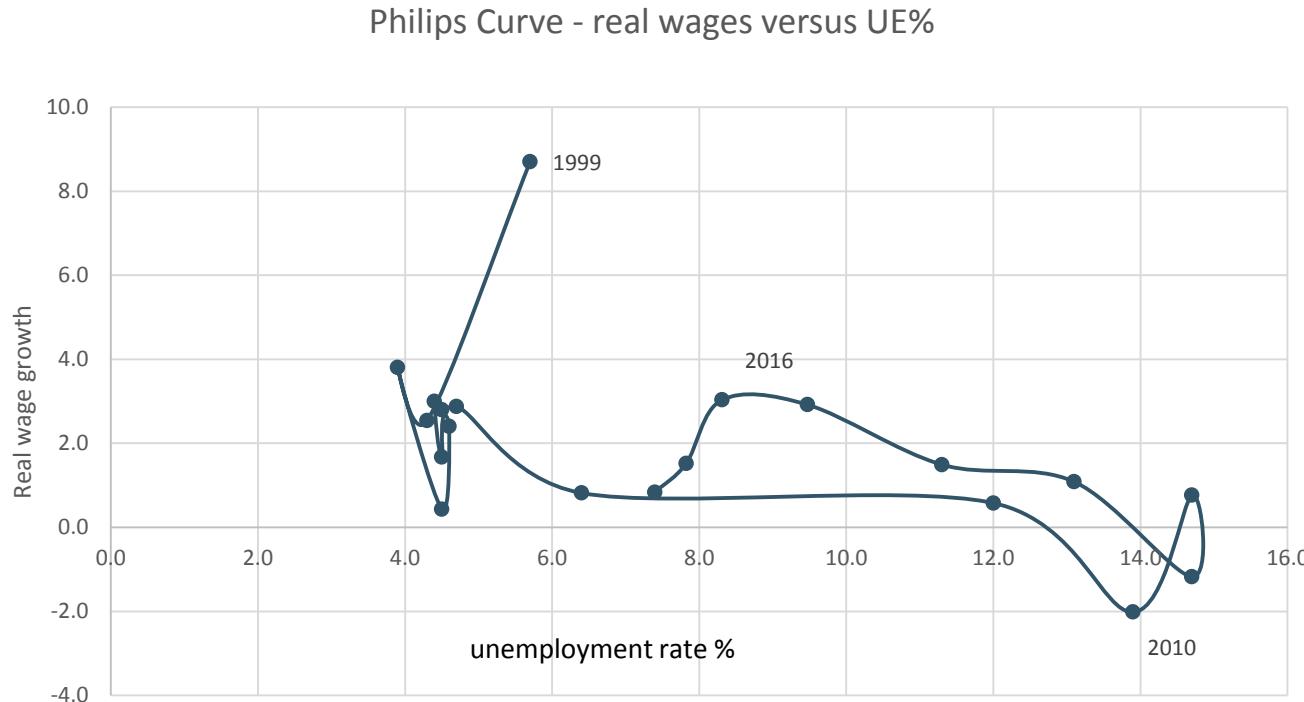
Note: Adjusted PC refers to specification with dummy for 2015-16. Unadjusted PC retains spike in rvgde due to NIE revisions.

New Keynesian Philips Curve: $\Delta rulc_t = \Delta rulc_{t-1} - [\beta_1(U_t - U_t^*) + \beta_2(U_{t-1} + U_{t-1}^*) + D_1 + D_2]$

$$D_1 = 1 \text{ for 2015, } D_2 = 1 \text{ for 2016}$$

- Adjusted NAWRU with dummies (_adj) improves fit of Philips Curve (lower tstat on β ML)

Resulting Philips Curve better able to identify UE gap...

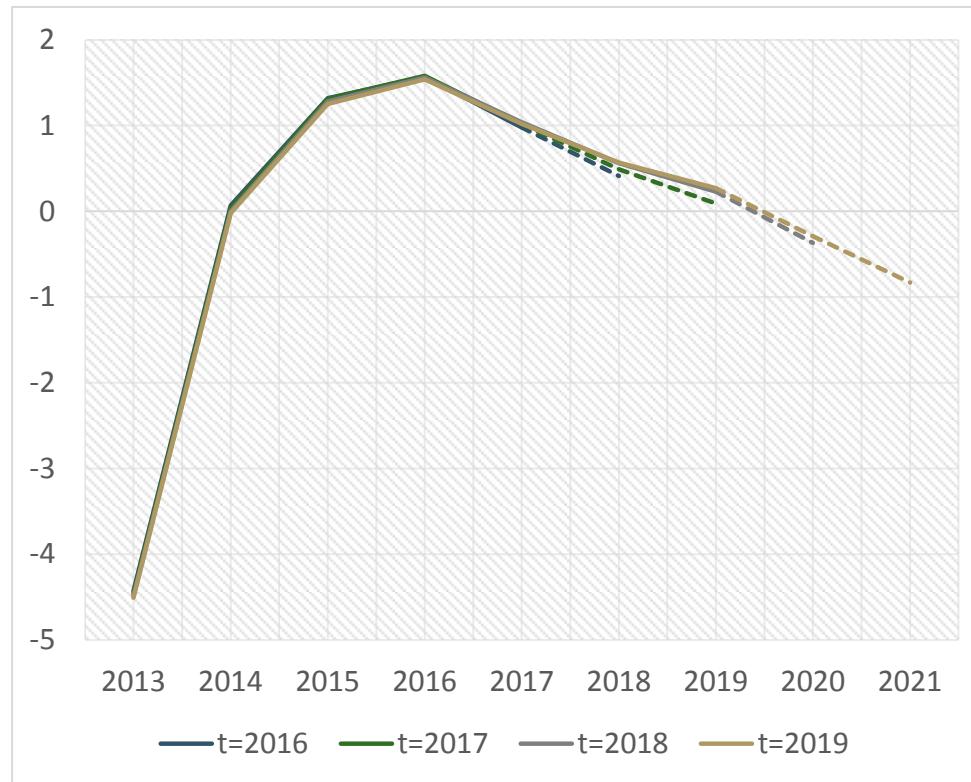


Note: Fit of adjusted Philips curve is above minimum threshold but still relatively poor in Irish case



Preliminary assessment of dummy impact on forecast stability

Output gap under rolling-period NAWRU estimation



Note: With each rolling window one-period ahead forecasts assumed = outturn

- Coefficient on dummies relatively stable across rolling-window estimation
- Coefficient of variation (COV%) rises marginally over windows, suggesting increasing variability
- Impact of dummy on stability of results will need careful monitoring



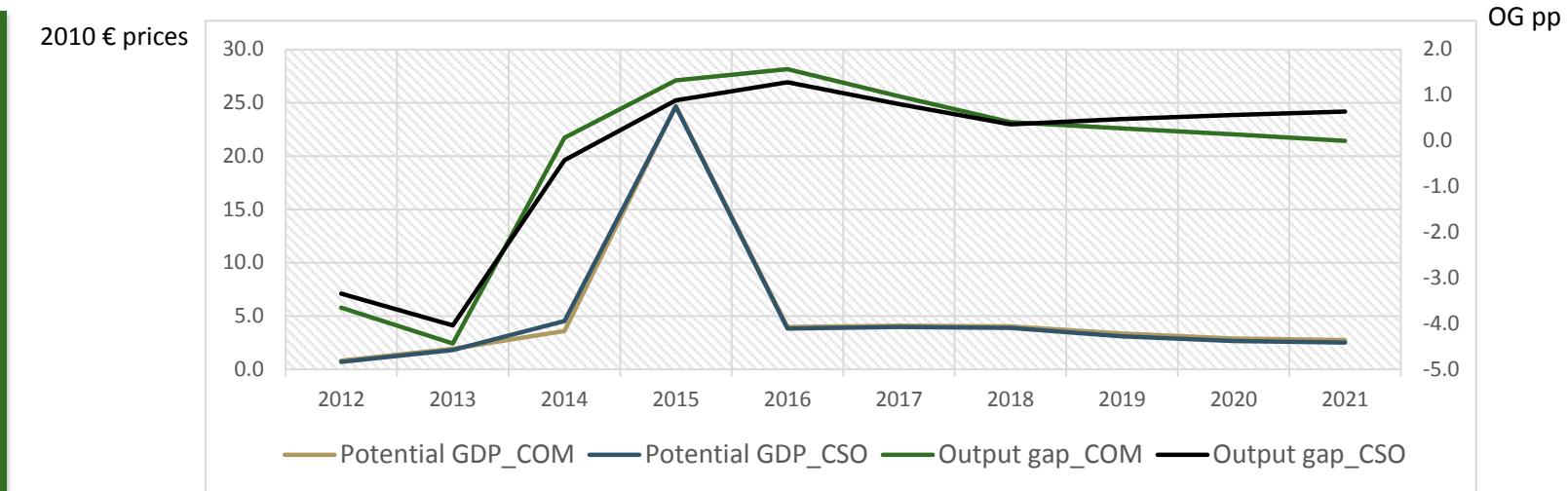
Closing output gap profile - consistent with higher stock levels..

	2014	2015	2016	2017	2018	2019	2020	2021
Preliminary Budget 2017 forecasts								
Real GDP growth	8.5	26.3	4.2	3.5	3.4	3.2	2.8	2.6
Potential GDP growth	3.4	24.7	4.0	4.1	4.0	3.4	2.9	2.7
WAP growth	0.0	0.1	0.8	0.9	1.1	1.0	0.9	0.8
Participation rate	64.4	64.7	65.0	65.4	65.7			
NAWRU %	11.2	10.2	9.2	8.3	7.3	6.9	6.9	6.9
Capital stock €bn (2010 prices)	477.3	746.2	745.6	749.6	756.8	762.4	770.4	779.7
Implied depreciation %	6.8	-43.1	7.9	7.8	7.7	8.2	8.1	8.2
Output gap	0.1	1.3	1.6	1.0	0.4	0.3	0.1	0.0

Note: Estimates based on harmonised t+5 methodology consistent with September 2016 agreement with Commission

Supply-side estimates based on demand side forecasts and filters applied to 2018. For 2019 onwards forecasts consistent with mechanical closure of the output gap in 2021. Capital stock level revised in 2015 only. NAWRU estimates post 2018 are purely mechanical in line with harmonised t+5 methodology

Illustrative impact of using full data on revised capital stock...



Marginal effects relative to Baseline (Variant- Baseline OG paths)

	2015	2016	2017	2018	2019	2020	2021
Baseline Output gap	0.1	1.3	1.6	1.0	0.4	0.3	0.1
Deviation from baseline pp							
Full data on K stock (V1)	-0.5	-0.4	-0.3	-0.2	0.0	0.2	0.4
Unchanged models (V2)	-1.9	1.0	0.6	0.4	0.1	0.0	-0.3
Higher NETN (V3)	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
Technical iypot* (V4)	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1

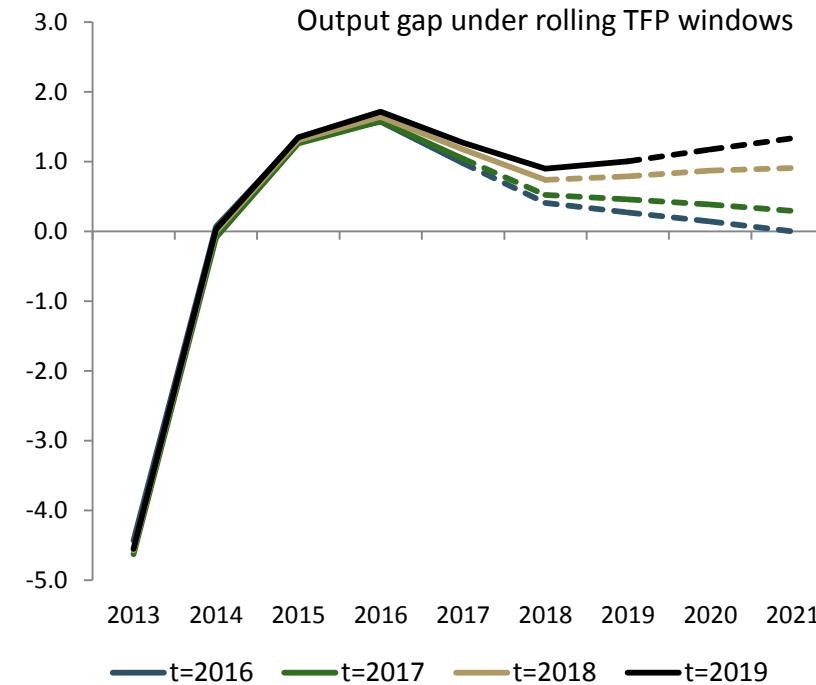
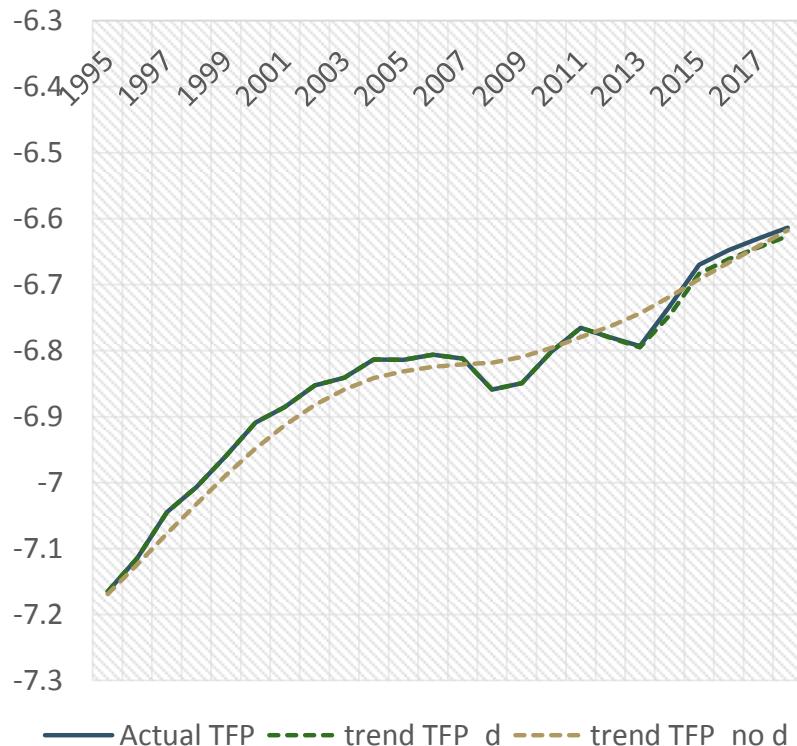
Adjustment to TFP model introduces TFP break...

$$tfp_t = p * t + c_t$$

$$u_t = \mu_u + \beta c_1 + \varepsilon_{ut}$$

$$p_t^* = p_t + \gamma d_t$$

Where $d_t = 0$ if $t < 2015$, 1 otherwise



Note: Rolling window approach similar to NAWRU dummy testing



NIE revisions alter composition of potential output...

Preliminary Budget 2017 supply-side outlook

	2015	2016	2017	2018	2019	2020	2021
Real GDP growth	26.3	4.2	3.5	3.4	3.2	2.8	2.6
Potential output growth	24.7	4.0	4.1	4.0	3.4	2.9	2.7
<i>Contributions to potential growth</i>							
Labour	1.4	1.8	1.7	1.5	1.0	0.4	0.2
Capital	16.2	0.0	0.2	0.3	0.3	0.4	0.4
Total Factor Productivity*	5.8	2.2	2.2	2.1	2.1	2.1	2.1

Arrows indicate revisions relative to Stability Programme Update 2016.

Note: NAWRU based on ML NKP modelling approach to 2018 with mechanical extension thereafter.

Non-centering adjustment factor or -0.43 applied. * Trend TFP estimated using Bayesian bivariate Kalman filter based on actual TFP including specification of dummy with revised CUBS inputs to 2018 and preliminary AUT16 priors to reflect revised solow residual path.

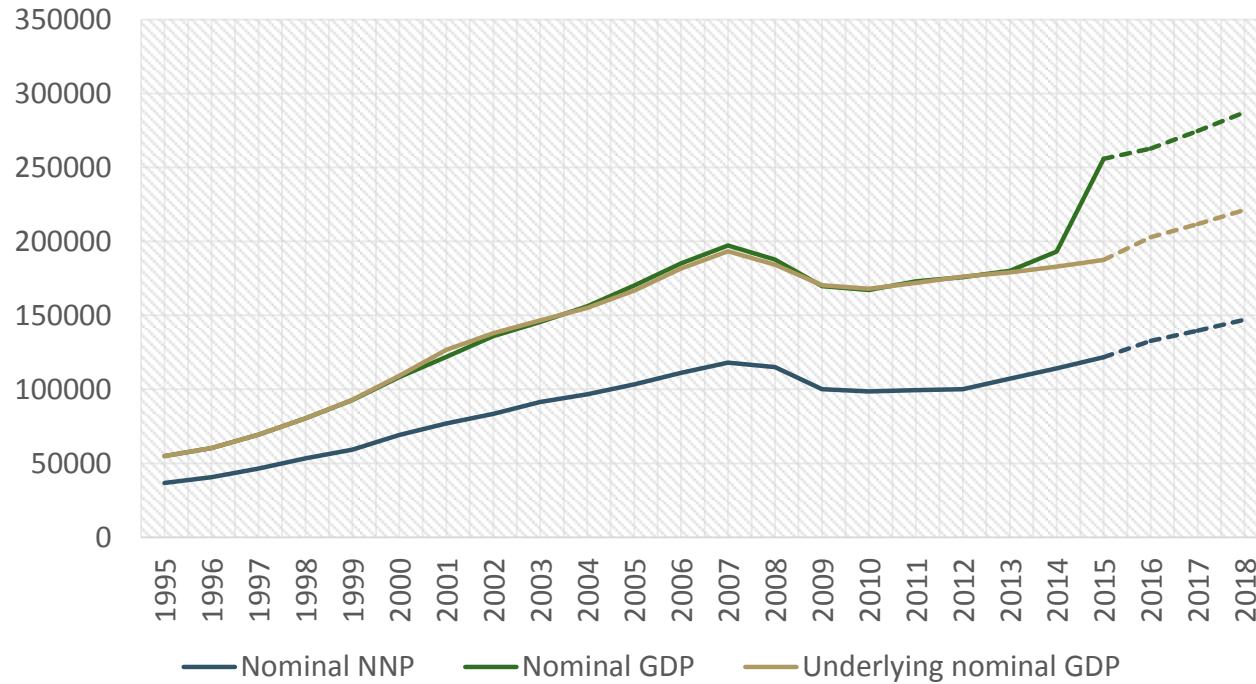
Issues in context of revised harmonised estimates...

- NIE revisions have had a significantly de-stabilising impact on estimates of potential GDP growth
- Department's underlying view of economy unaltered due to revisions – potential growth has not undergone discrete jump from 4% to 25% in 2015
- Agreed adjustments to harmonised methodology have neutralised impact of data revisions on 2015 and attempt to purge forecasts of related distortions
- Stability of estimates post-2015 remains unclear as yet
- Raises questions as to appropriateness of OG as anchor for policy formation
- Emphasises need for complementary toolkit to monitor cyclical position (see Annex).



Alternative measures of underlying output...

Current price €mns



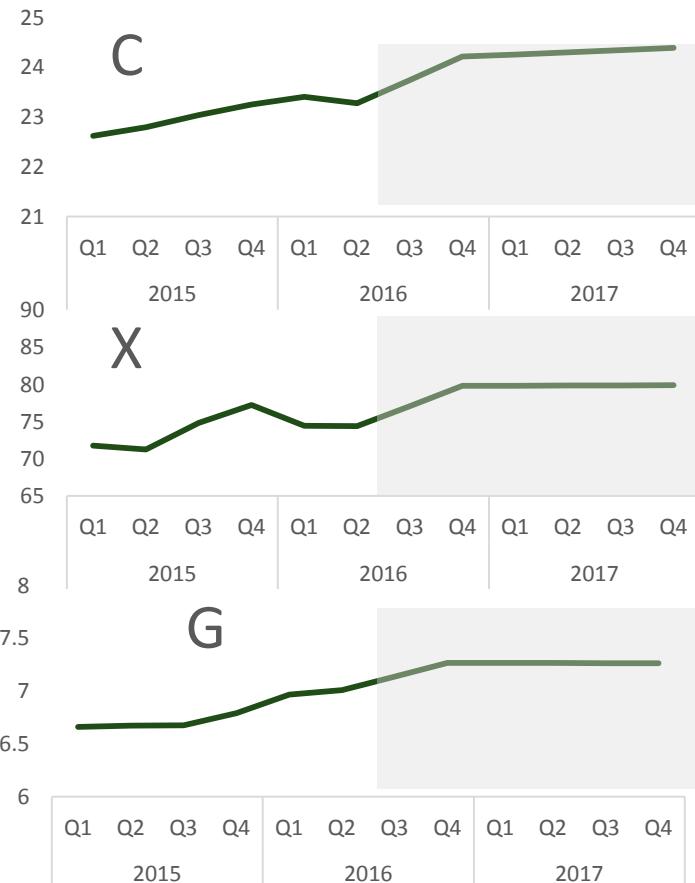
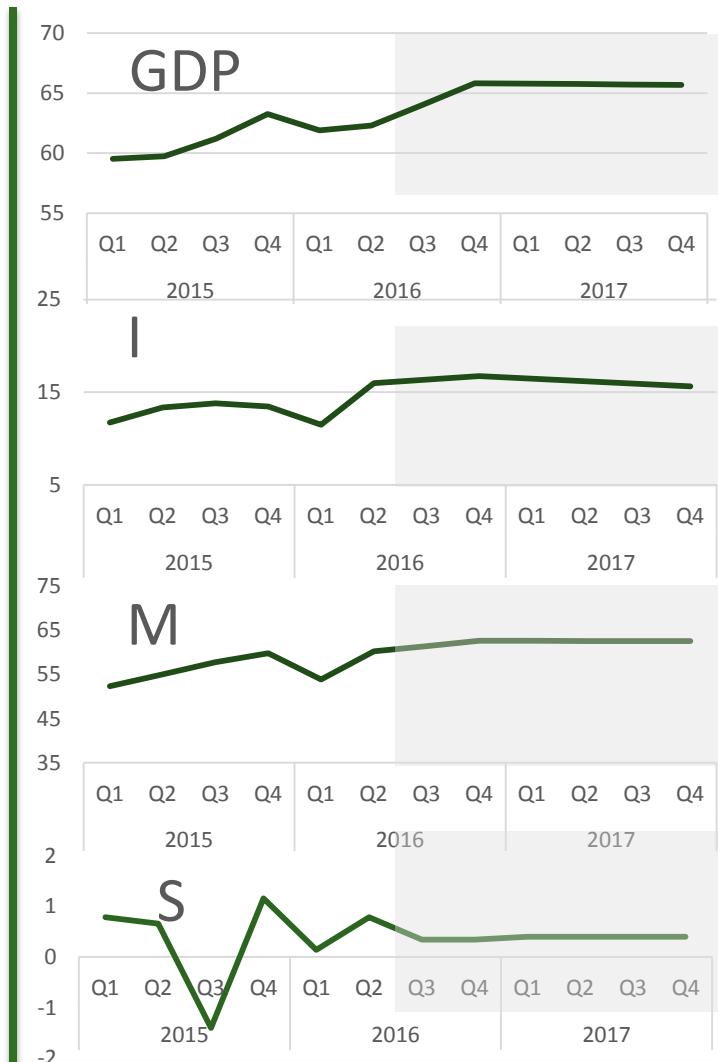
Source: Department of Finance

Note: Underlying nominal GDP estimated as headline nominal less the contract manufacturing component of net trade

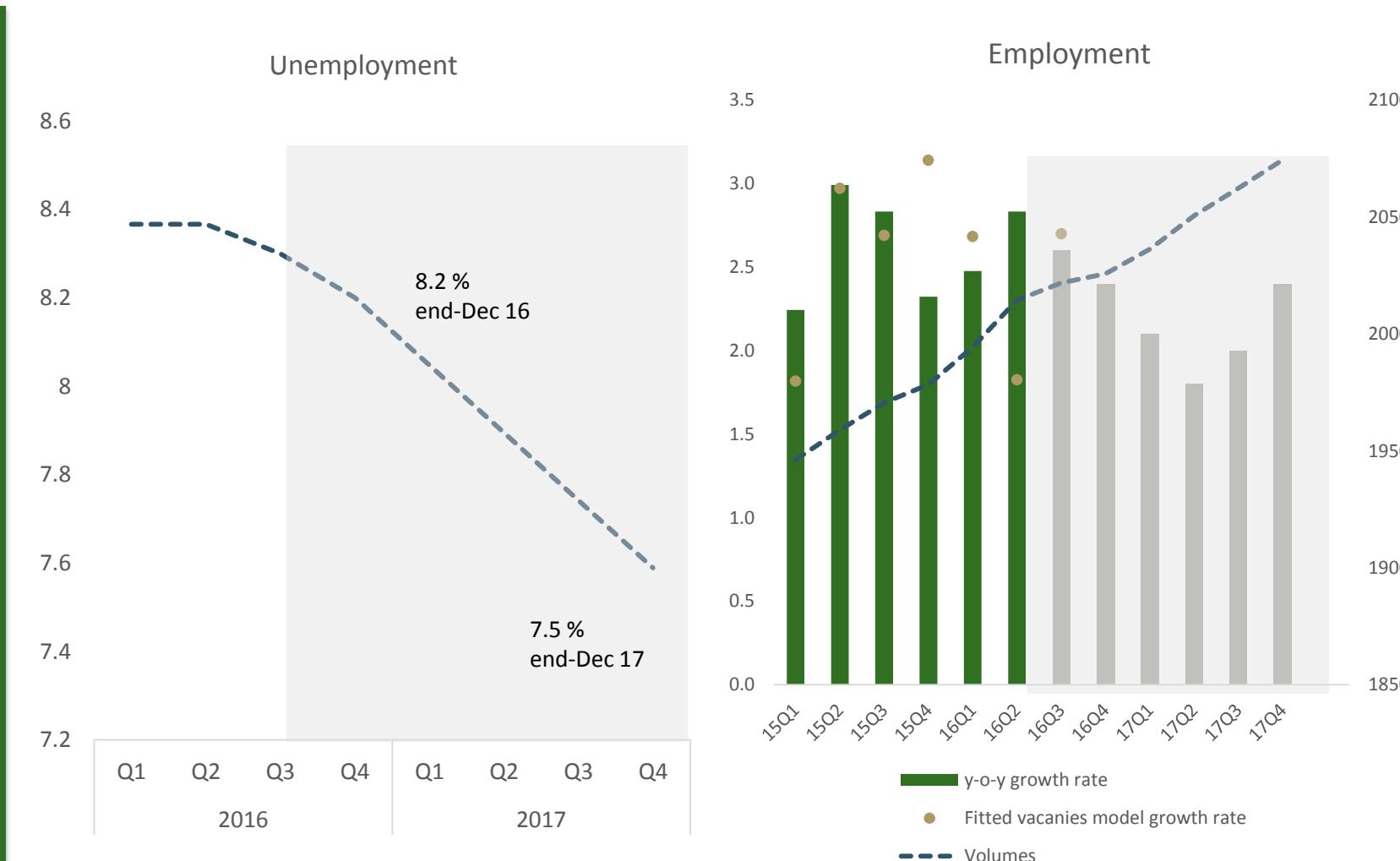
Annex: Quarterly profiles



Quarterly profiles – real growth

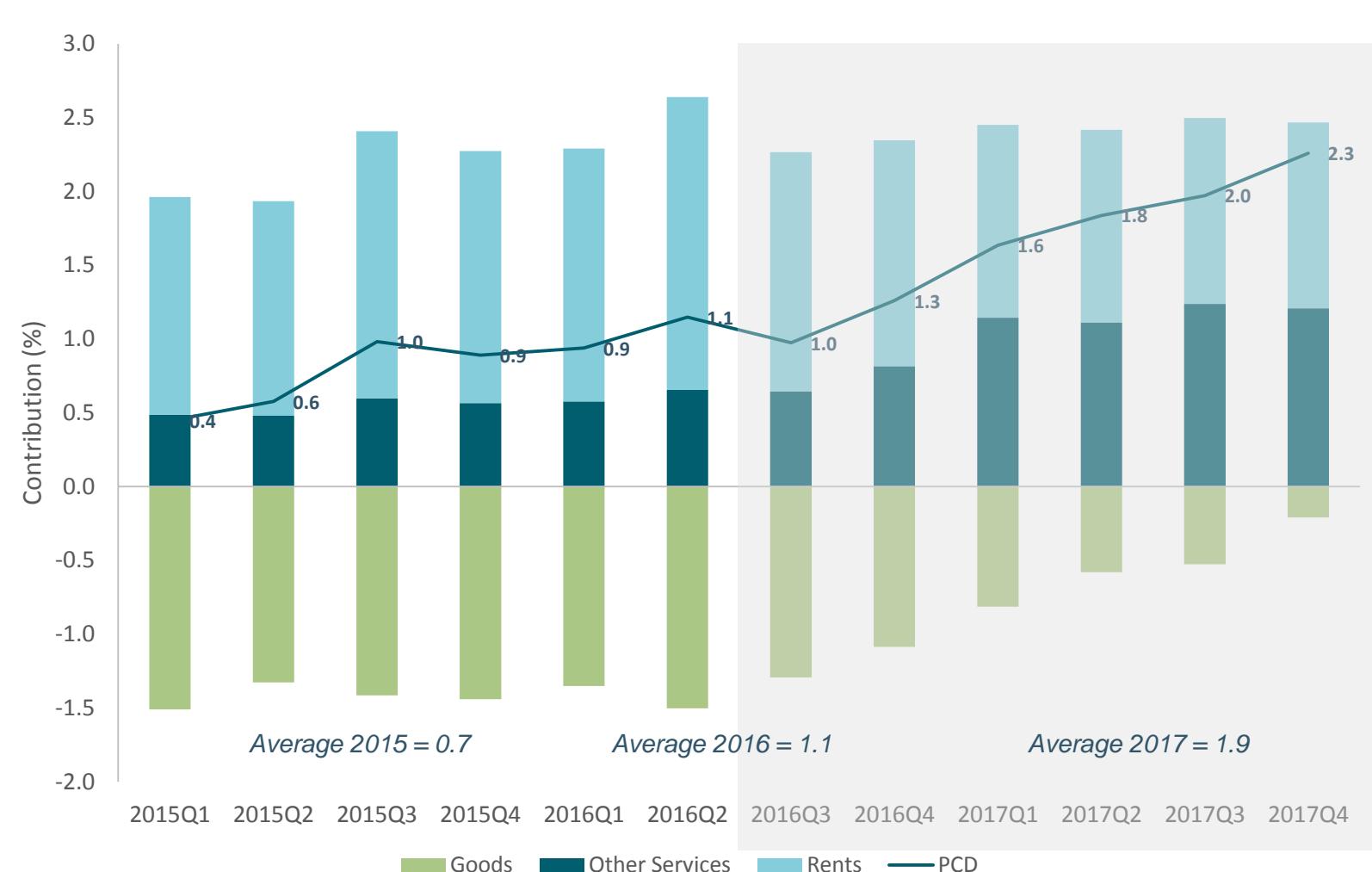


Quarterly profiles (2016-2017) – labour market

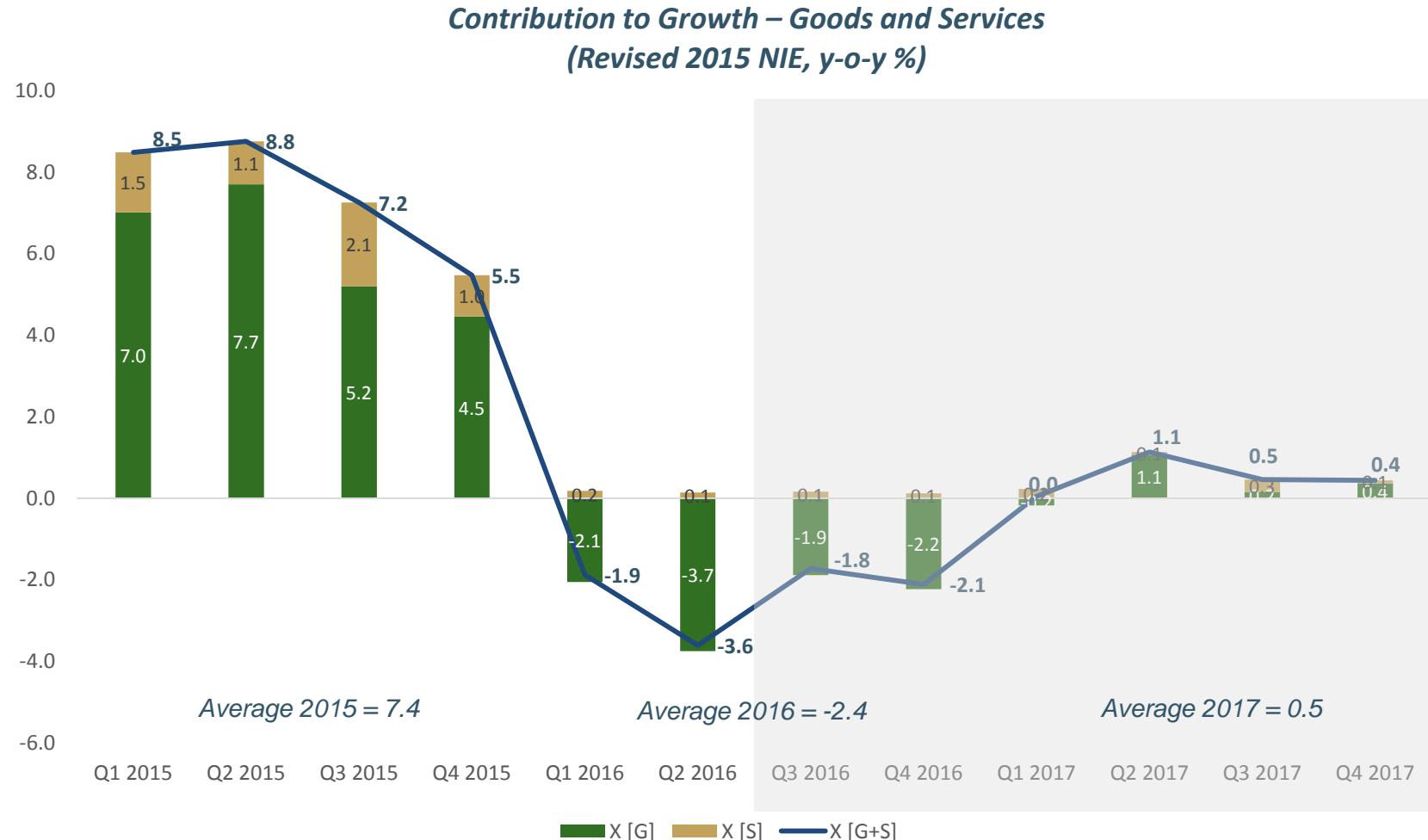




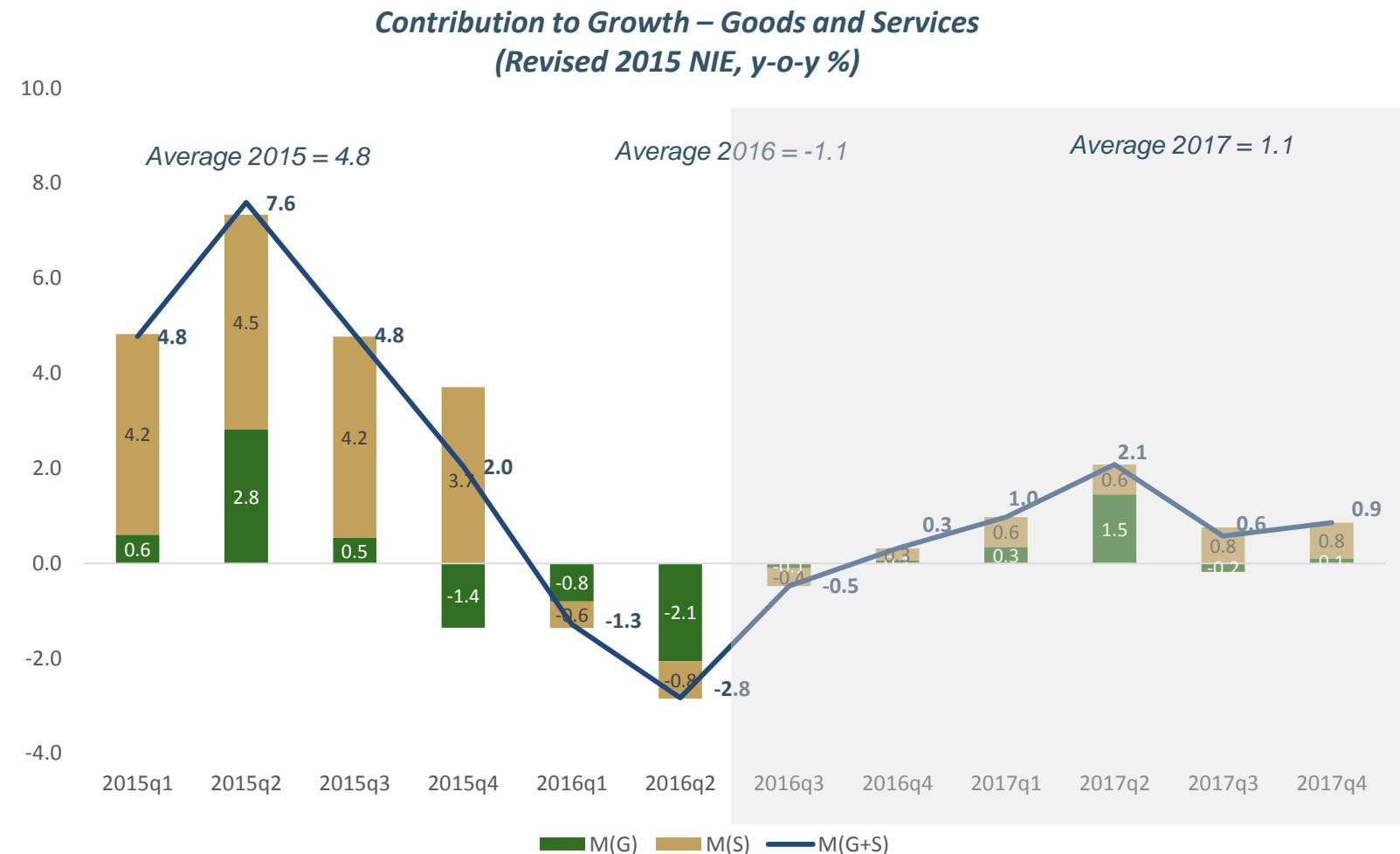
Personal Consumption Deflator - Quarterly profiles (2015-2017)



Export Price Deflator - Quarterly profiles (2015-2017)



Import Price Deflator - Quarterly profiles (2015-2017)



Annex: Modelling output



Forecasting Models – Specification and Goodness of fit

Export Deflator Model:

Export price of goods



$$XP_G = 0.52 + 0.29 * MP_G - 0.23 * USD + [AR(1) = 0.19, MA(2) = 0.67]$$

Where:

XP_G = Export Price of Goods (y-o-y % change); MP_G = Import Price of Goods (y-o-y % change); USD = USD/Euro (y-o-y %)

Export price of services



$$XP_S = 0.33 + 0.79 * XP_S_{(t-1)} - 0.54 * XP_S_{(t-4)} + 0.63 * XP_S_{(t-5)} - 0.07 * GBP_{(t-1)}$$

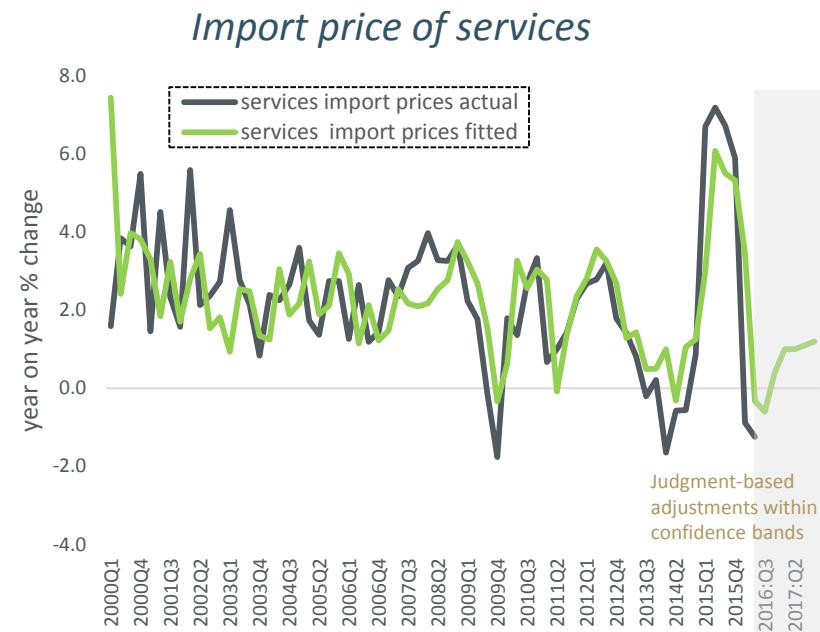
Where:

XP_S = Export Price of Services (y-o-y % change); GBP = GBP/Euro (y-o-y %)



Forecasting Models – Specification and Goodness of fit

Import Deflator Model:



$$MP_G = 0.05 - 0.74 \cdot HCI + 0.05 \cdot OIL_{(t-1)} + [AR(2)=0.57, AR(4)=-0.64, MA(1)=0.70]$$

Where:

MP_G = Import Price of Goods (y-o-y % change); HCI = Harmonised Competitiveness Index; OIL = Brent Crude Oil Prices (y-o-y %)

$$MP_S = 2.38 - 0.25 \cdot HCI + [AR(1) = 0.62] \\ [GARCH = 0.12 - 0.18 \cdot (RESID(t-1))^2 + 1.12 \cdot GARCH(t-1)]$$

Where:

MP_S = Import Price of Services (y-o-y % change); HCI = Harmonised Competitiveness Index



Forecasting Models - Specification

HICP Inflation Models:

- $\Delta ENERGY = 0.11 * \Delta OIL + 0.24 * \Delta ENERGY_{(t-1)} + 0.05 * ENERGY_{(t-1)} - 0.28 * (ECM_{(t-1)})$
 $ECM = 2.67 + 0.15 * OIL$

Where: ENERGY = Energy Prices (y-o-y % change); OIL = Brent Crude Oil Prices (y-o-y %)

- $\Delta NEIG = 0.18 * \Delta EMP_{(t-1)} + 0.64 * \Delta NEIG_{(t-2)} - 0.04 * \Delta EU_BP_{(t-1)} - 0.25 * (ECM_{(t-1)})$
 $ECM = 0.81 - 0.01 * EU_BP + 0.37 * EMP_{(t-1)} - 0.04 * trend$

Where: NEIG = Non-Energy Industrial Goods Prices (y-o-y % change); EMP = Employment (y-o-y % change); EU_BP = Euro/Sterling (%)

- $CSI = 0.44 + 0.08 * EMP_{(t-1)} + 0.94 * CSI_{(t-1)} - 0.57 * CSI_{(t-4)} + 0.41 * CSI_{(t-5)}$

Where: CSI = Core Services Inflation (y-o-y % change); EMP = Employment (y-o-y % change)

- $D\ln(UF_HICP) = -0.0015 + 0.42 * D\ln(UF_HICP)_{(t-1)} + 0.22 * D\ln(UF_HICP)_{(t-3)} - 0.14 * D\ln(HCI)_{(t-3)} + 0.03 * D\ln(OIL)_{(t-2)} + 0.03 * D\ln(OIL)_{(t-3)}$

Where: UF_HICP = Unprocessed Food Prices (Index); HCI = Harmonised Competitiveness Index; OIL = Oil Prices (euros)

- $D(PROCESSED_FOOD) = 0.38 * D(PROCESSED_FOOD)_{(t-1)} + 0.05 * D(API_{(t-1)}) + 1.39 * D(ADT)$

Where: PROCESSED_FOOD = Processed Food Prices (Index); API = Agricultural Output Price Index; ADT = Alcohol & Tobacco Tax Dummy

Finance-neutral Output Gap - using underlying current account..

BIS Borio et al (2014) specification itself unchanged...

$$\text{Min} \sum_{t=1}^T \left[\frac{1}{\sigma_4^2} (e_{4,t})^2 + \frac{1}{\sigma_0^2} (e_{0,t})^2 \right]$$

$$\text{s/t } \Delta y^*_{t+1} = \Delta y^*_t + e_{0,t}$$

$$y_t = y^*_t + \beta(y_{t-1} - y^*_{t-1}) + \gamma' z_t + e_{4,t}$$

Vector of exogenous variables

$$Z_t = \{\Pi_t, r_t, CA_u_t, \Delta cr_t, \Delta hp_t\}$$

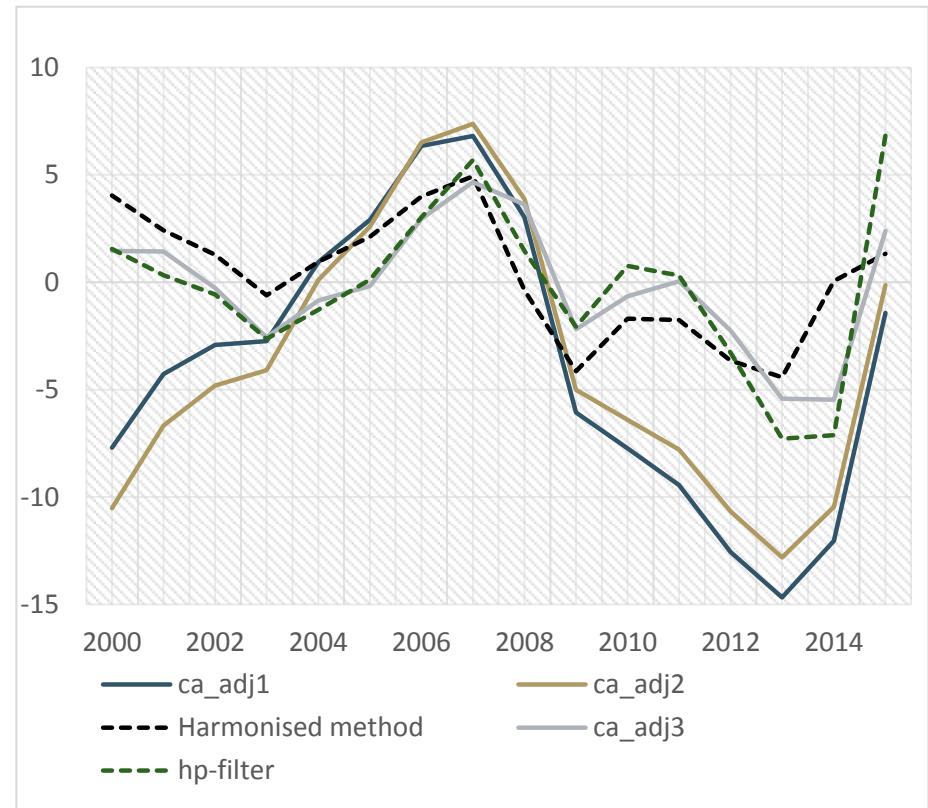
$$\text{Prior: } \lambda_t = \frac{\sigma_4^2}{\sigma_0^2} s/t$$

$$\frac{\text{var}(y_t - y^*_t)}{\text{var}(\Delta y^*_t - \Delta y^*_{t-1})}$$

ca_adj1 = merch. trade less primary income

ca_adj2 = ca - CMx - redom - aircraft leasing - proxied CM-element of royalties and prim Y outflows

ca-adj3 = ca_adj2 plus proxied CM-element of R&D imports

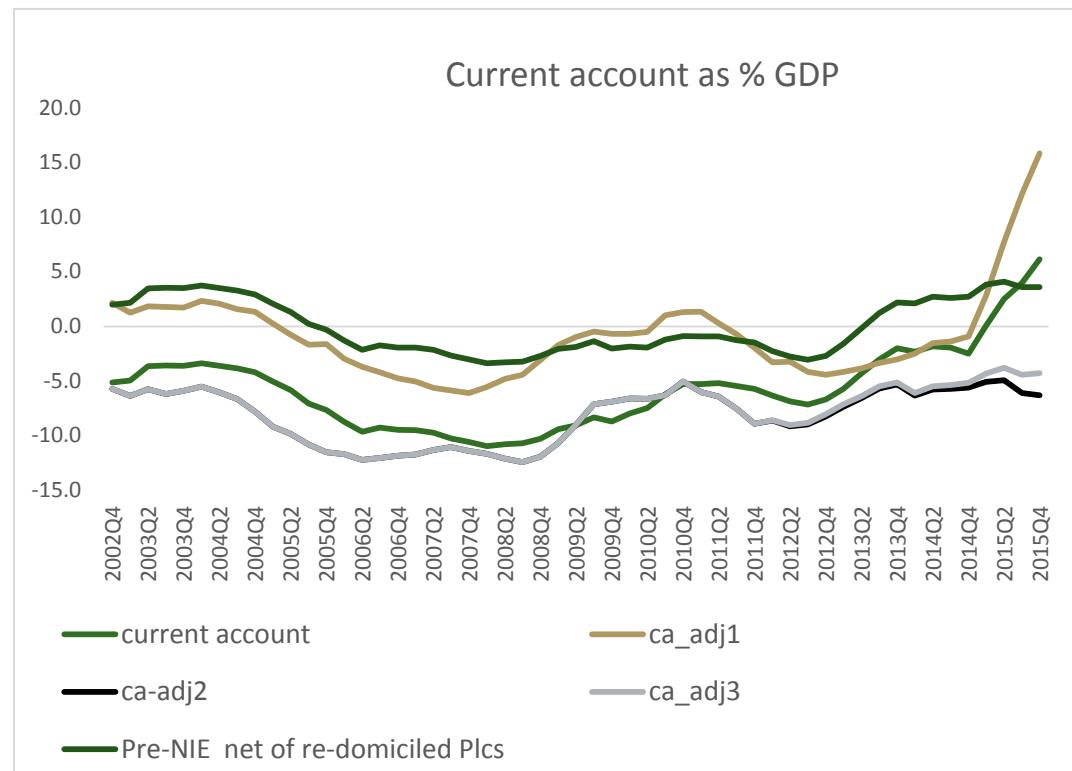
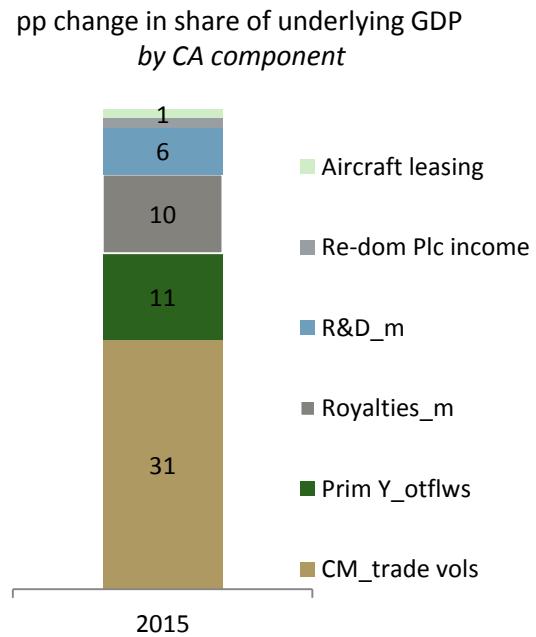


Source: DoF calculations based on data to Q2 2016

Note: Incorporating NIE 2015 revisions

Using underlying current account proxy...

$$CA \ adj = CA_H - Re_dom_Plc_Y - CM_X + Prim_Y_{CM} + Roy_{CM} + R\&D_m_{CM} - Operat_leasing_X$$



Source: Department of Finance estimates using CSO data to Q2 2016. All series are sample de-meaned.

ca_adj1 = merch. trade less primary income

ca_adj2 = ca - CMx - redom - aircraft leasing - CM element (royalties+ prim Y outflows)

ca-adj3= ca_adj2 plus CM-element of R&D imports

Finance-neutral output gap diagnostics: Post-NIE 2015 analysis

Model results using **ca_adj1** definition: ca_adj = merch trade – primary income

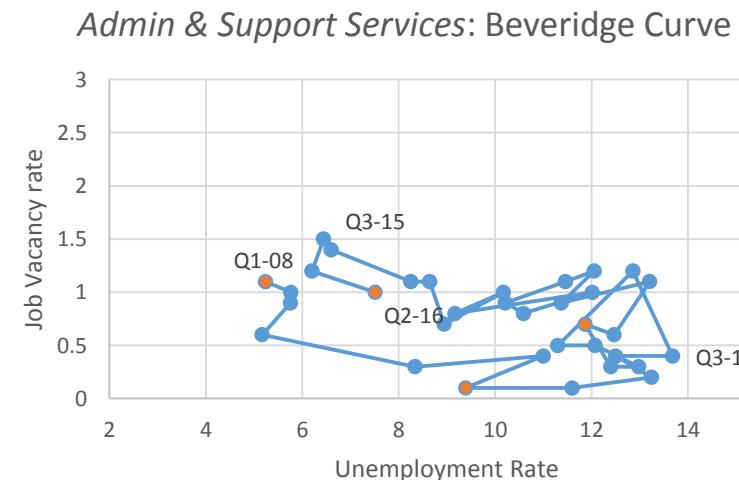
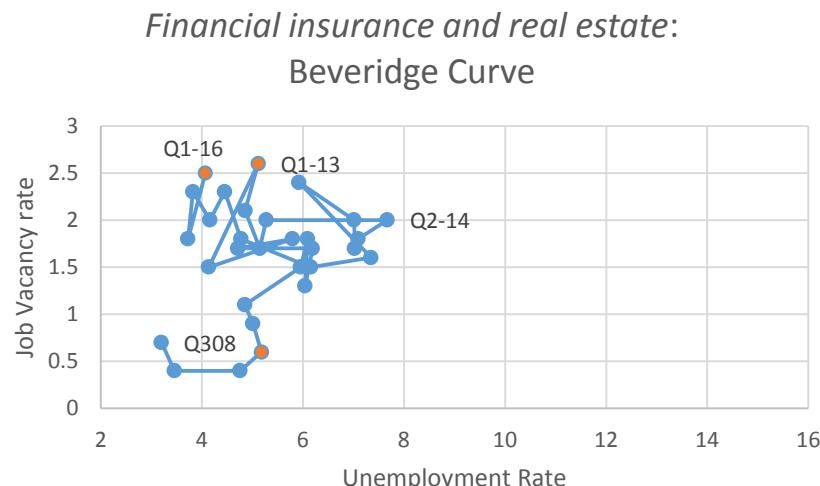
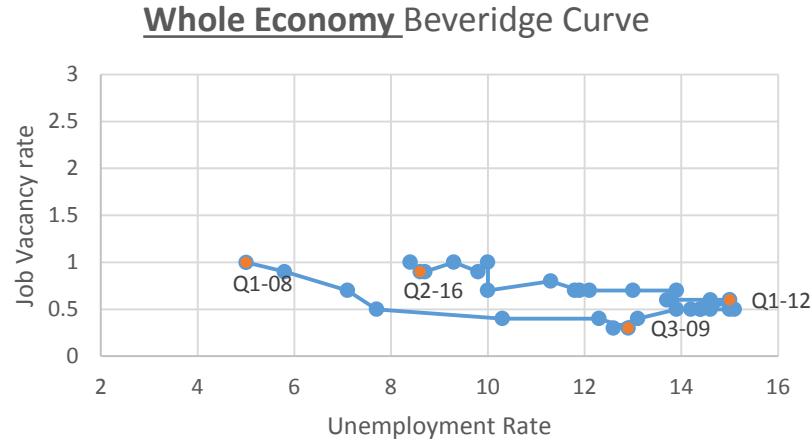
Model	AR β	π	CA_unadj	CA_adj	$\Delta CR_{adj,t}$	ΔHP_t	rr	RMSE	Schwartz BIC/Akaiki	Log likelihood
Model 1*	0.340	0.024		0.016		0.005	0.026	0.034	-2.45	79.6
	0.014	0.045		0.001		0.000	0.095		-2.75	
Model 2	0.067			-0.120	-0.006	0.082	0.121	39.6	10.56	-260.6
	0.980			0.999	1.000	0.999	1.000		10.29	
Model 3	0.824	0.003	0.001		-0.001	0.003	0.007	548.6	-2.18	72.5
	0.077	0.922	0.960		0.182	0.160	0.847		-2.48	
Model 4	0.385	0.002		0.012	0.001	0.003		503.2	-2.50	78.9
	0.002	0.674		0.004	0.234	0.023			-2.77	
Model 5	0.999			0.011		0.003	0.001	293.9	-2.87	116.2
	0.000			0.004		0.054	0.858		-3.06	
	Note: Each model based on system of state equations based on quarterly data used to Q4 2015. Adjusted current account nets off primary income from the merchandise trade balance. Adjusted private sector credit is PSC private sector enterprise credit exlc. financial intermediation plus the stock of hhd loan liabilities outstanding									

Finance-neutral output gap diagnostics: Post-NIE 2015 analysis

Model results using ca_adj2 definition

Model	AR β	π	CA_unadj	CA_adj	$\Delta CR_{adj,t}$	ΔHP_t	rr	RMSE	Schwartz BIC/Akaiki	Log likelihood
Model 1*	0.036	0.012		-0.012	-0.001	0.002	0.022	0.05	-2.015	68.2
	0.823	0.476		0.189	0.143	0.131	0.303		-2.316	
Model 2	0.361			0.065	0.000	-0.065	-0.183	41.8	10.407	-256.7
	0.746			0.990	1.000	0.996	0.999		10.144	
Model 3	0.176			0.005	-0.001	0.003	0.007	548.6	-2.48	72.52
	0.521			0.960	0.182	0.160	0.076		-2.180	
Model 4	0.311	0.003			0.000	0.001			-2.380	73.77
	0.033	0.728			0.691	0.414		533.0	-2.600	
Model 5	5.550			-0.001		0.001	0.002	576.8	-2.760	112.1
	0.983			0.085		0.276	0.829		-2.950	
	Note: Each model based on system of state equations based on quarterly data. Adjusted current account consistent with definition of ca_adj2 in slide58-59. Adjusted private sector credit is PSC private sector enterprise credit excl. financial intermediation plus the stock of hhd loan liabilities outstanding									

Inward shifting *Beveridge Curve* - improvement in labour matching...



Source: Department estimates based on CSO QNHS data to Q2 2016.

Note: Sectoral unemployment rates are proxied using data by last occupied sector.