The Housing Market and the Irish Macroeconomy

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Macroeconomic Implications of Housing Markets

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Overview

- The interaction between the Irish housing market and
  - The financial sector and the fiscal accounts
- Both the property and mortgage market are still in recovery mode
- Empirical analysis suggests both:
  - House prices and supply are below long-run equilibrium levels
- Presentation draws on two separate papers:
  1. "Macroprudential policy in a recovering property market: Too much too soon?"
     - ⋆ with David Duffy and Niall Mc Inerney
  2. "Assessing the sustainable nature of housing-related taxation receipts: The case of Ireland"
     - ⋆ with Diarmaid Smyth

The Housing Market and the Irish Financial Sector:

- Examine implementation of macroprudential policy in the Irish market
- Structural econometric model of Irish housing and mortgage markets
- To assess the impact of changes in credit conditions on
  - Both property and credit/mortgage markets
- Macroprudential policy operates via demand for new mortgages
- Main conclusion:
  - Policy exerts a contractionary impact on a recovering market

The Housing Market and the Irish Fiscal Accounts:

- Housing market dis-equilibrium and exchequer receipts
- Turbulent relationship between taxation and housing
- Using models of house prices and supply
  - Identify periods of dis-equilibrium
- Quantify revenue windfalls/losses
  - From the Irish property market
- Since the financial crisis:
  - EU and domestic policy developments since then
  - Fiscal rules, EU semester, budgetary councils

Irish Housing Market: A Current Assessment

Summary of House Prices and Housing Supply Models

- House price model (Kelly & McQuinn (2014))
  - Standard inverted demand function

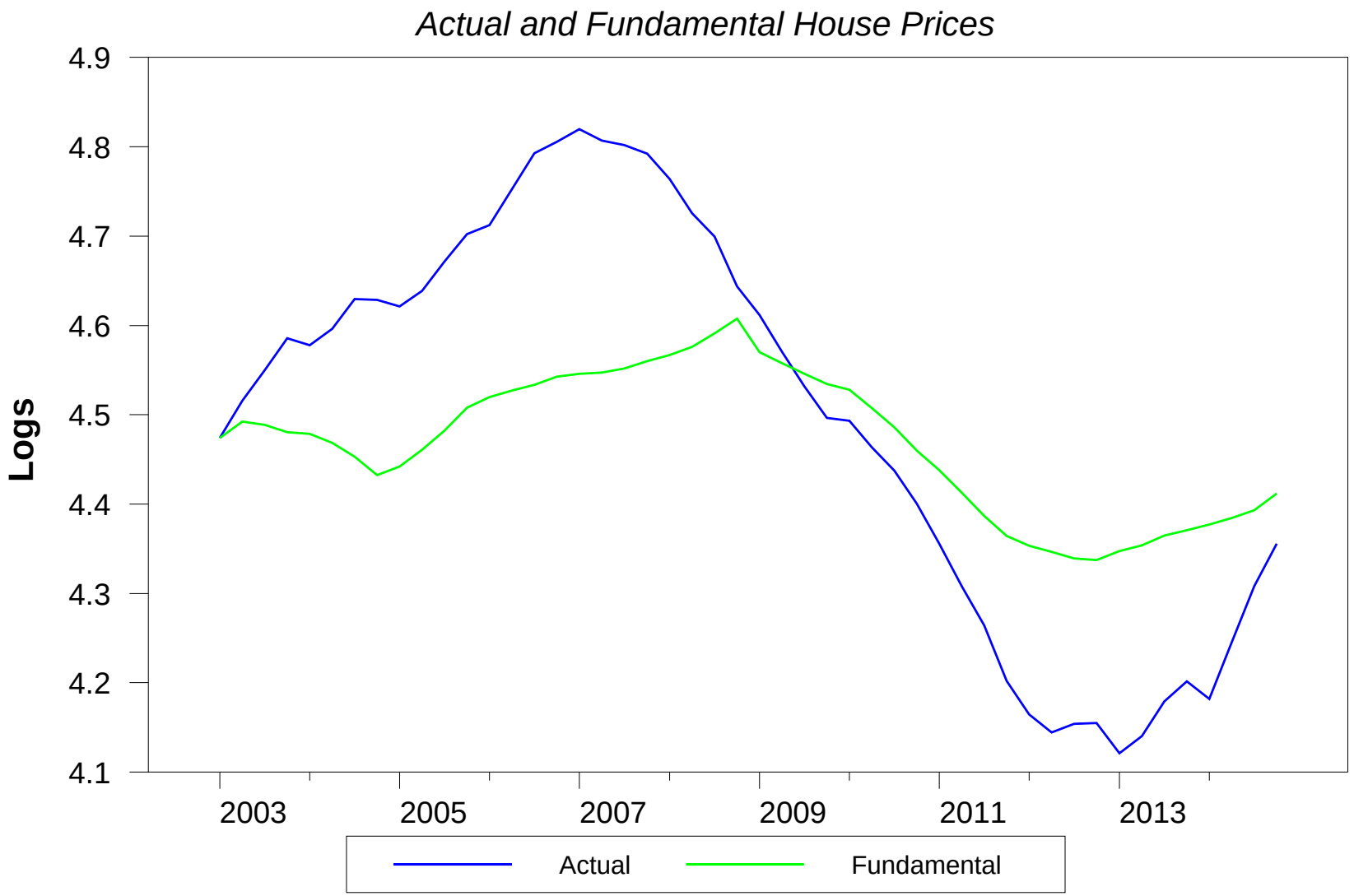
$$ln\ p = \frac{\alpha_1}{\alpha_2}\ ln\ (\frac{y}{pop}) - \frac{1}{\alpha_2}\ ln\ (\frac{h}{pop}) - ln\ uc + \frac{\alpha_3}{\alpha_2}\ ln\ pop$$

- Housing supply (Duffy, Byrne & FitzGerald (2014))
- Independent households = population forecasts $\times$ headship rate
  - Headship rate = rate of household formation
  - Proportion of individuals in an age cohort "head of household"
  - Micro data from either Census or QNHS
- Solution to both models = estimate of fundamental level

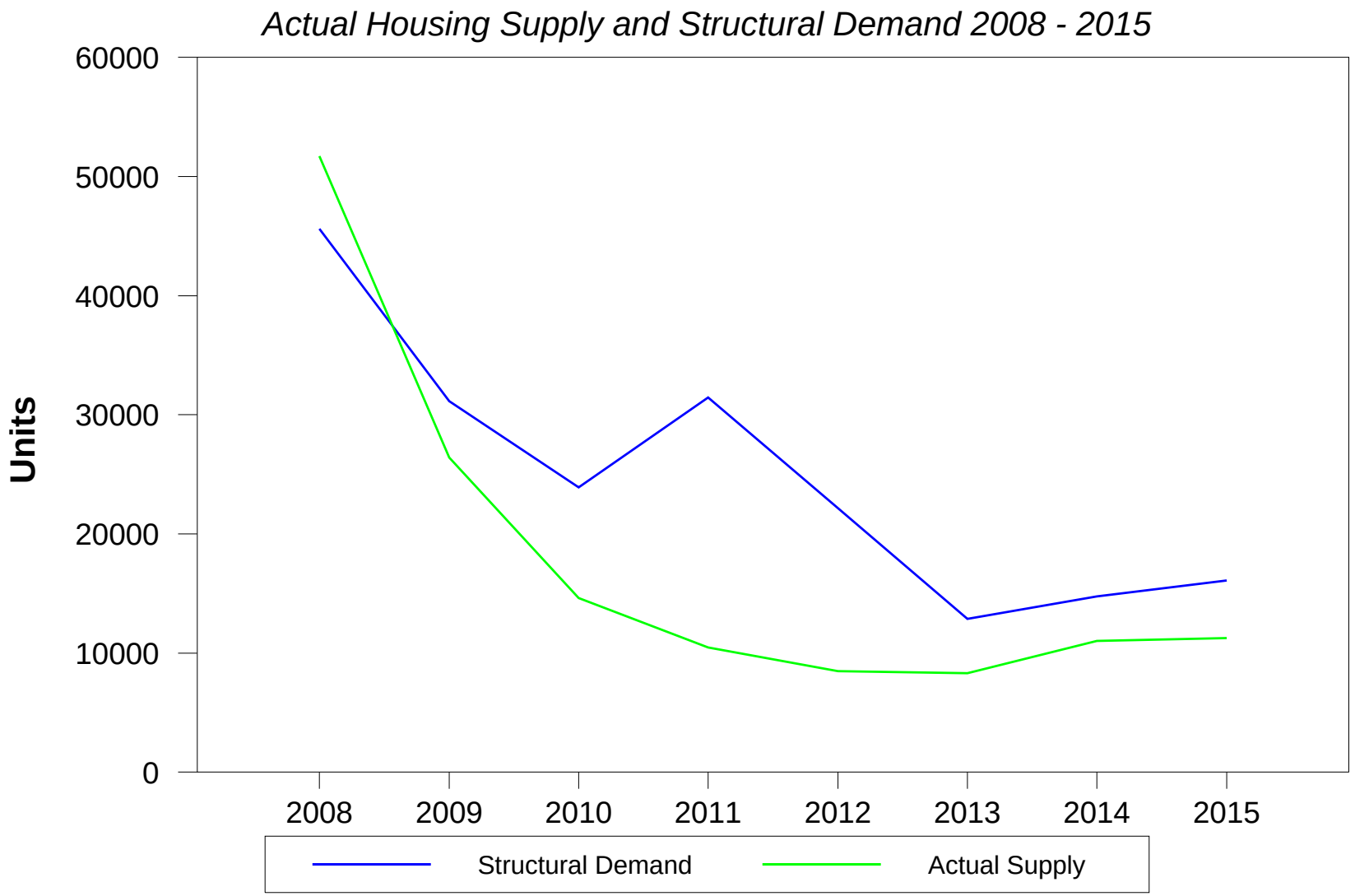
The Irish Housing Market Now

- Since 2013 Irish economy has shown significant signs of recovery
  - Dublin house prices increasing strongly since late 2012
  - Regional prices beginning to increase in 2014
- McQuinn (2014) suggests prices still below long-run equilibrium
  - Market may be near to equilibrium in Dublin
- However analysis of the supply-side suggests
  - Supply well below equilibrium level (Duffy et al, 2014)
  - 25,000 units required - actual supply = 14,500
  - Outstanding mortgage stock continues to decline
- Examination of credit aggregates reveals continuing declines

Actual and Fundamental Irish House Prices



Irish Housing Supply and Structural Demand

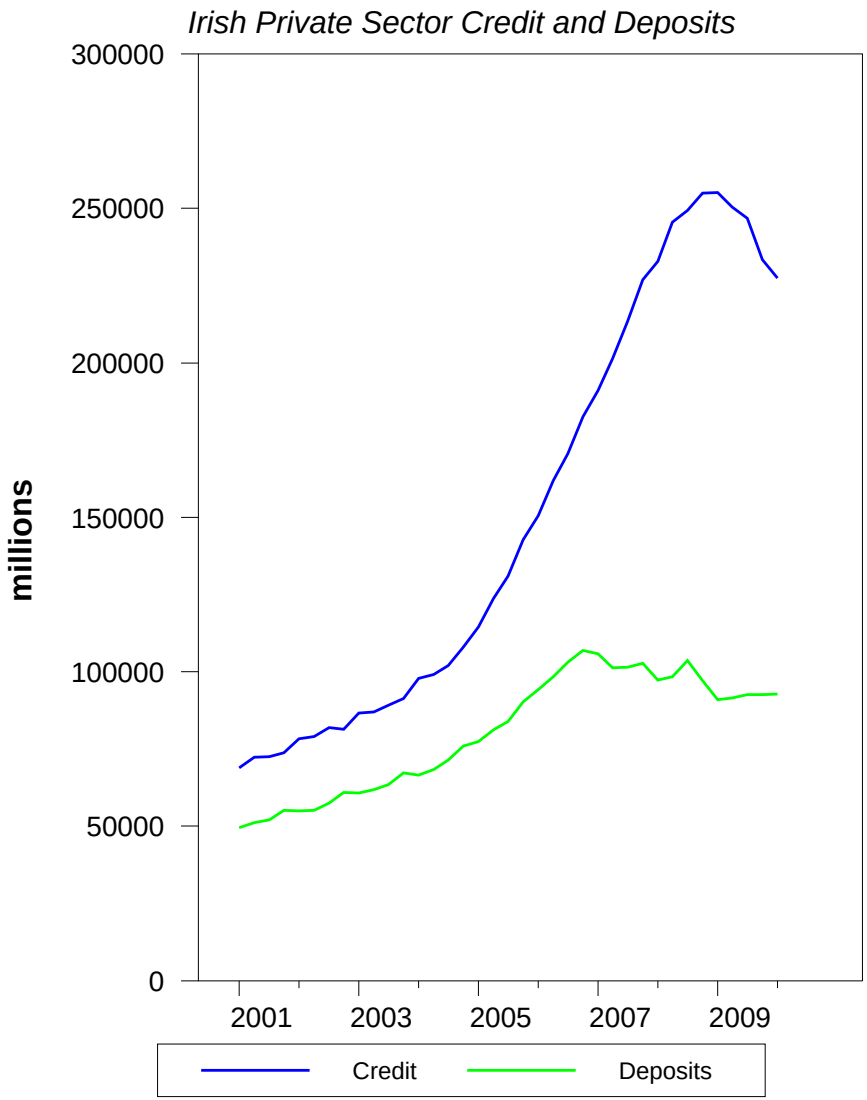


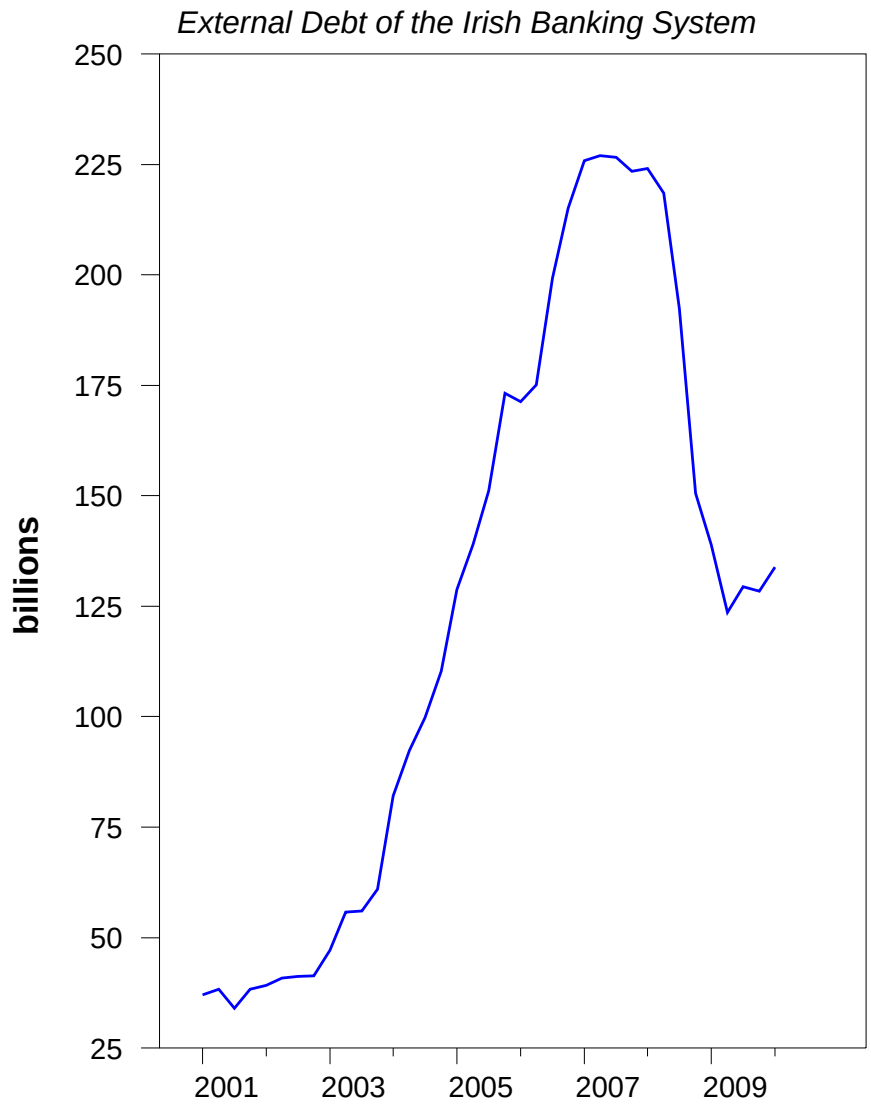
Housing and the Financial Sector

The Irish Mortgage Market in Context

- Significant financial deregulation and liberalisation since 1980s
  - Removal of credit and interest-rate controls
- Late 1990s: most significant structural change in provision of credit
  - Ability of Irish banks to attract deposits from non-residents
  - International funding fueled increase in loan-to-deposits (LTD) ratio
- Credit supply schedule became flatter
  - Rising credit demand accommodated without increasing interest rates
- Substantial exposure to residential (and commercial) property market
  - Proliferation of mortgage products
  - Loans with longer maturities and higher LTVs and LTIs (Doyle, 2009)

Irish Banking Sector Data





Macroprudential Policy and the Housing Market

- Economic rationale:
  - Limit household leverage and income gearing
  - Lower leverage may lead to less speculation ("more skin in the game")
  - Dampen procyclicality of bank lending and financial accelerator effects
  - lower LTIs improve affordability providing greater resilience to income and interest rate shocks
- Costs:
  - Some agents are rationed out of the market
  - Calibration is difficult
  - Distort market outcome
- Central Bank of Ireland introduce
  - Limits on LTVs and LTIs in January 2015

A Structural Model of Mortgage and Housing Markets

- Inextricable link between Irish property and mortgage market
- Estimate a structural model of Irish housing and credit markets
  - Crucially allows for macroprudential policy
  - (Gerlach-Kristen and McInerney, 2014)
- Isolates supply and demand factors in mortgage and housing markets
- Jointly estimated using 3SLS to
  Capture spillovers and instrument for potentially endogenous variables
- Use the model to simulate:
  The potential impact of recently introduced mortgage restrictions

Mortgage Demand

- Model demand for new mortgages =
  f(house prices, household income, credit conditions and the cost of borrowing)

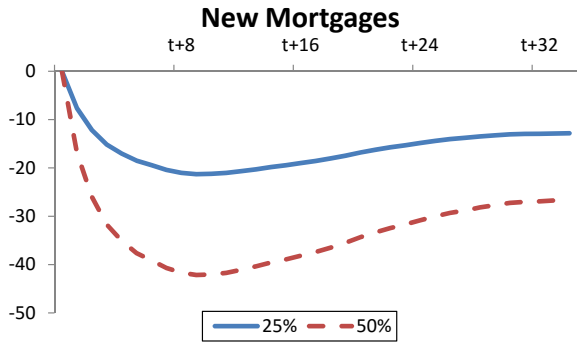
- Endogeneity of LTV and LTI?
  - Banks vary ratios in response to conditions in the housing market?
  - Remove demand-side changes in LTV and LTI

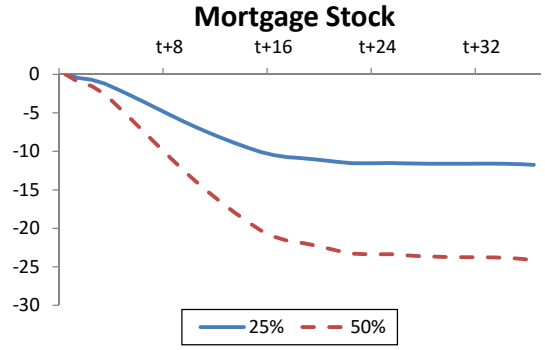
$$\begin{aligned} NewMortgages_t = \alpha_1 + \beta_1 NewMortgages_{t-1} + \beta_2 RMorRate_t \\ + \beta_3 \triangle Income_t + \beta_4 \triangle HPrice_{t-1} + \beta_5 LTI_t \\ + \beta_6 LTV_t + \beta_7 Spread_t + \epsilon_{1,t} \end{aligned}$$

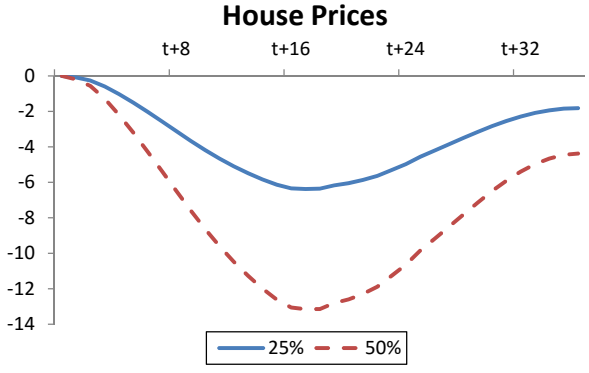
- Mortgage stock evolves according to perpetual inventory method

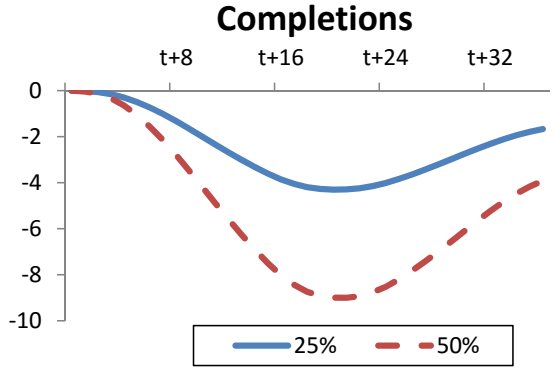
Simulation: Potential Impact of Mortgage Restrictions by percent 'Displaced'

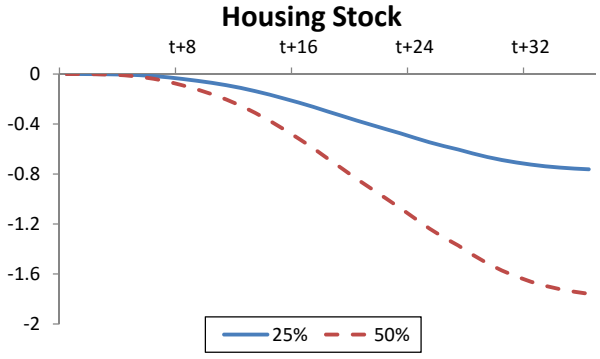
% Deviation from Historical Baseline

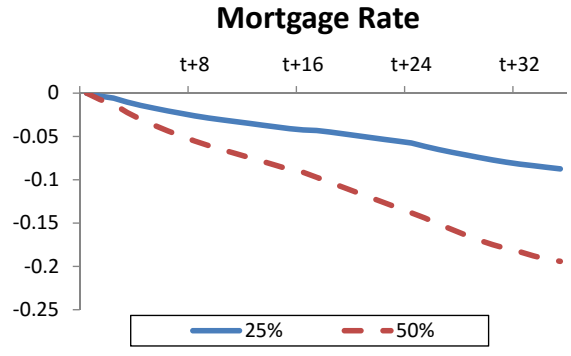












Housing and the Financial Sector - Conclusions

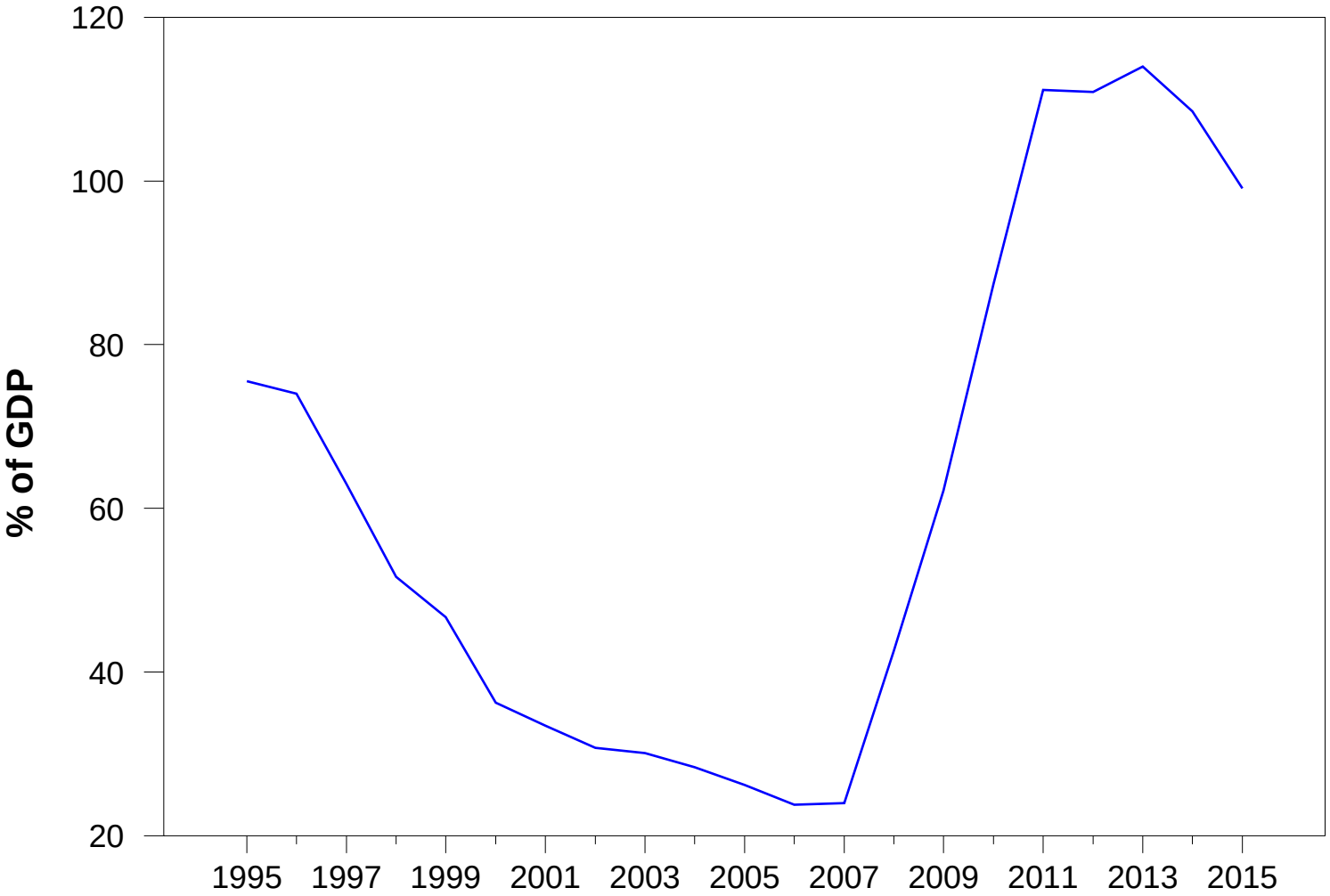
- Some Caveats
  - Model assumes raising and lowering LTI/LTV has symmetric effects
  - Macroprudential policy may works via expectations
- Overall
  - Macroprudential policies necessary for a stable housing/credit market
  - Simulations: suggest prices constrain housing supply *ceteris paribus*
  - Alter tenure choice putting upward pressure on rents
- Limits on LTV and LTI
  - More effective when house prices and credit growing strongly?
  - Rules regime where countercyclical macroprudential rules paramaterised
  - Incorporating house price, credit and *supply* indicators
  - Ultimately rules better able to influence expectations?

Fiscal Accounts and Housing

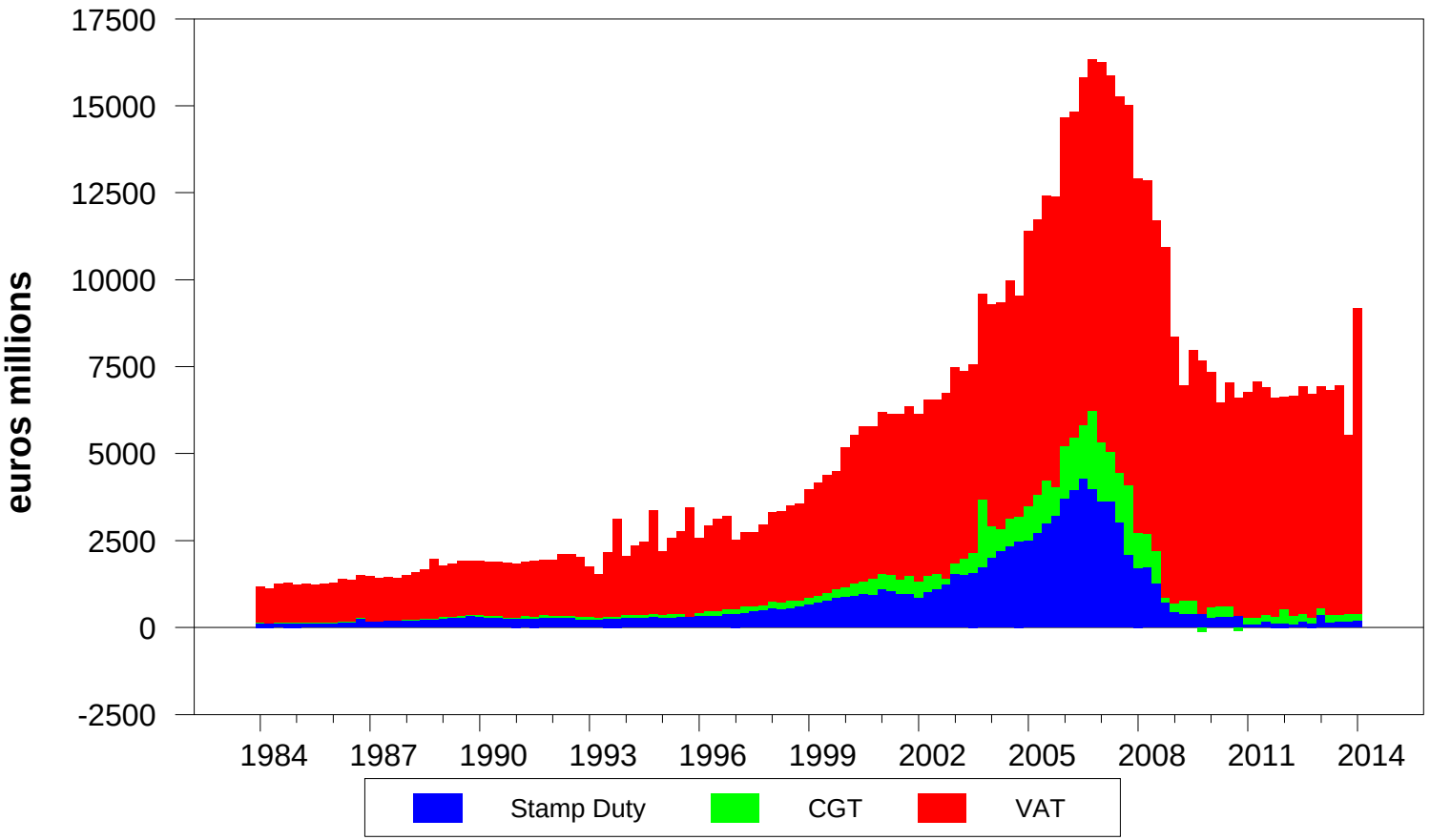
The Irish Housing Market and the Public Finances

- In light of the post 2007 sharp contraction in both
  - Taxation receipts and housing activity
- Empirically quantify
  - *Short-fall* in taxation receipts
  - Due to the underperformance of the housing market
- Comment on the importance of granular level assessment
  - Given the more "macro/aggregate" type policy responses

General Government Debt



Annualised Housing Related Taxation Aggregates



Sustainable Level of Taxation Receipts?

- Estimates of housing market equilibrium
- We relay the housing components of VAT, Stamps and CGT
- To key activity levels in the housing market
  - Prices and Supply
- To generate an equilibrium level of both we need
  - A model of house prices (Kelly and McQuinn (2014)) and
  - Long-run supply (Byrne, Duffy and FitzGerald (2014))

Modelling Taxation Components

- Housing components of CGT, stamp duty and VAT (Q_t)
  - Specified as a function of house prices and supply

$$Q_t = f(P_t, H_t)$$

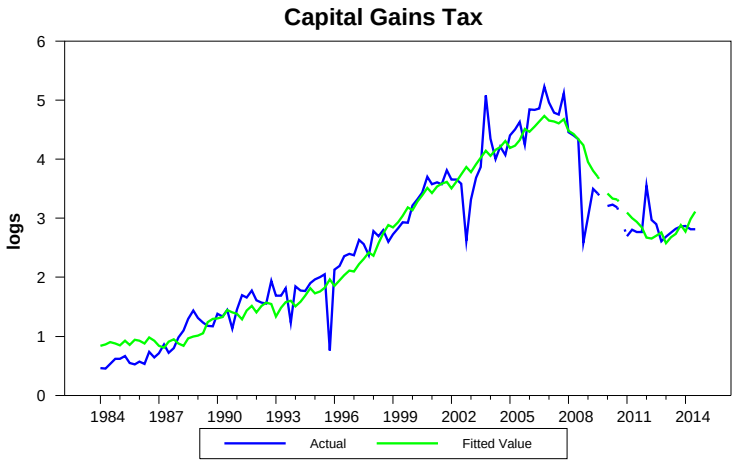
- All three items are modelled in log-linear manner

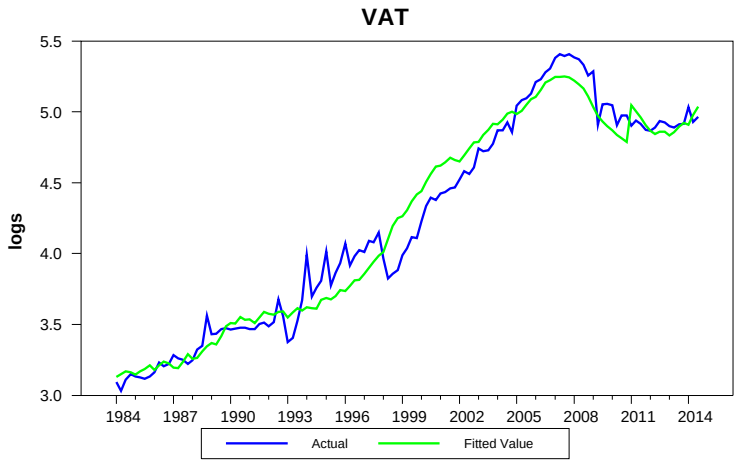
$$c_t = \gamma_0 + \gamma_1 p_t + \gamma_2 h_t + \epsilon_t$$

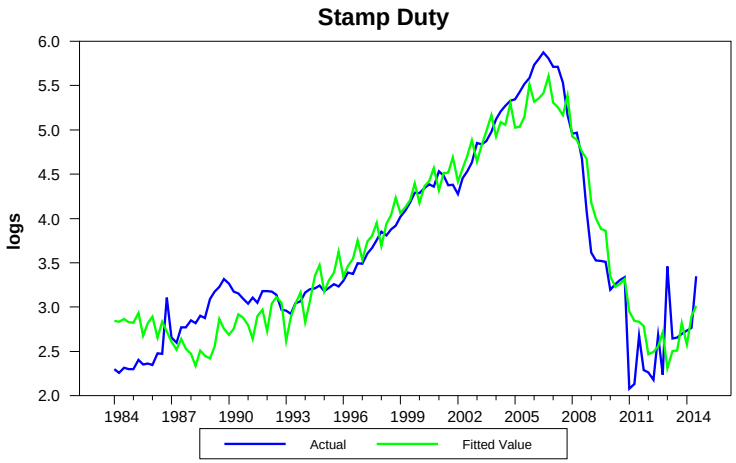
$$v_t = \alpha_0 + \alpha_1 p_t + \alpha_2 h_t + \epsilon_t$$

$$s_t = \beta_0 + \beta_1 p_t + \beta_2 h_t + \epsilon_t$$

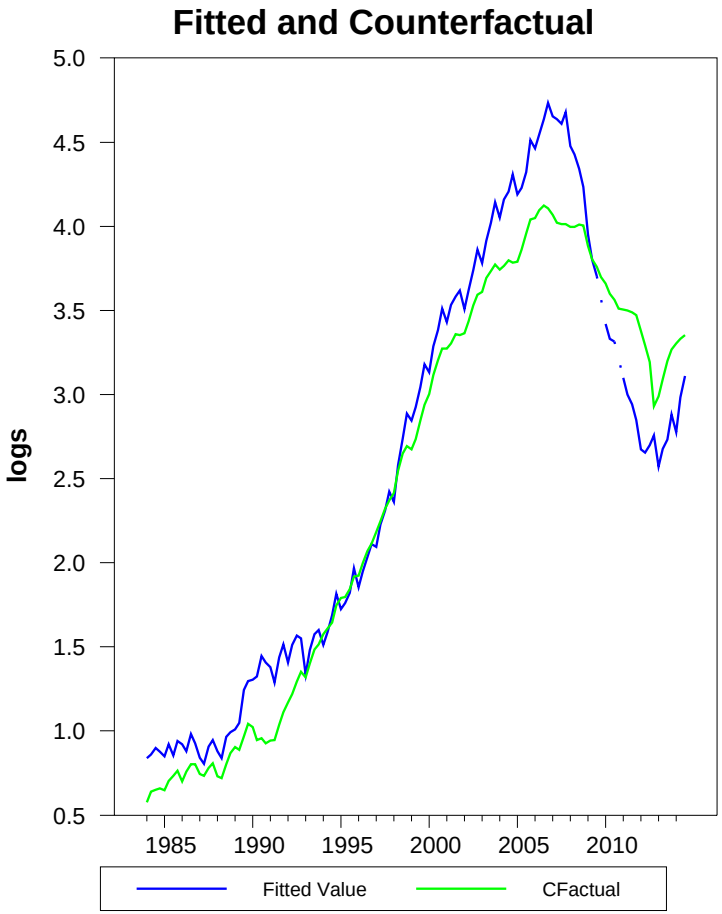
Tax Aggregates Actual and Fitted Values

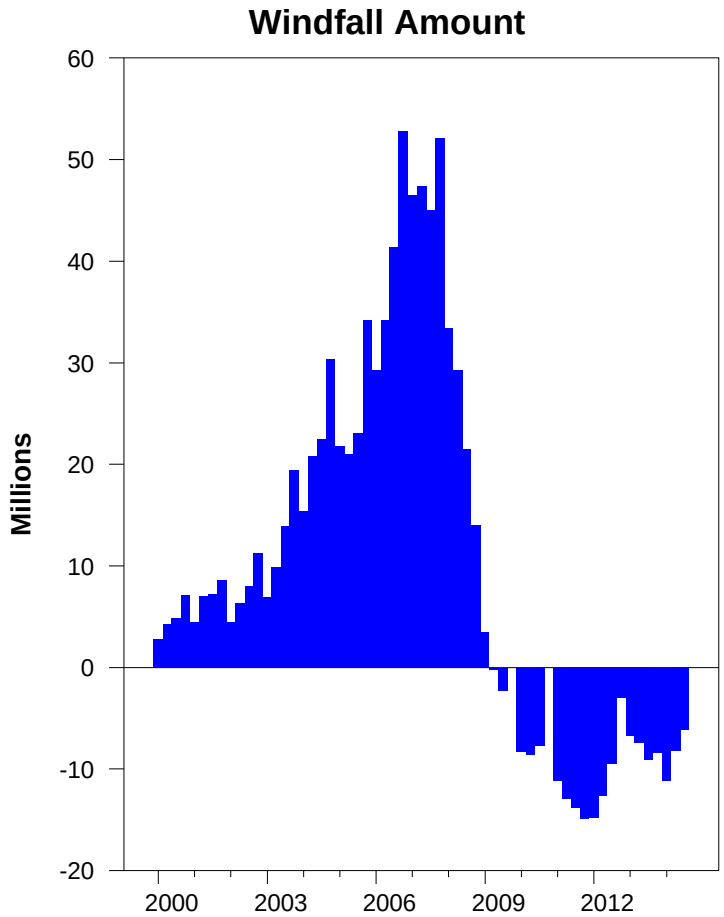




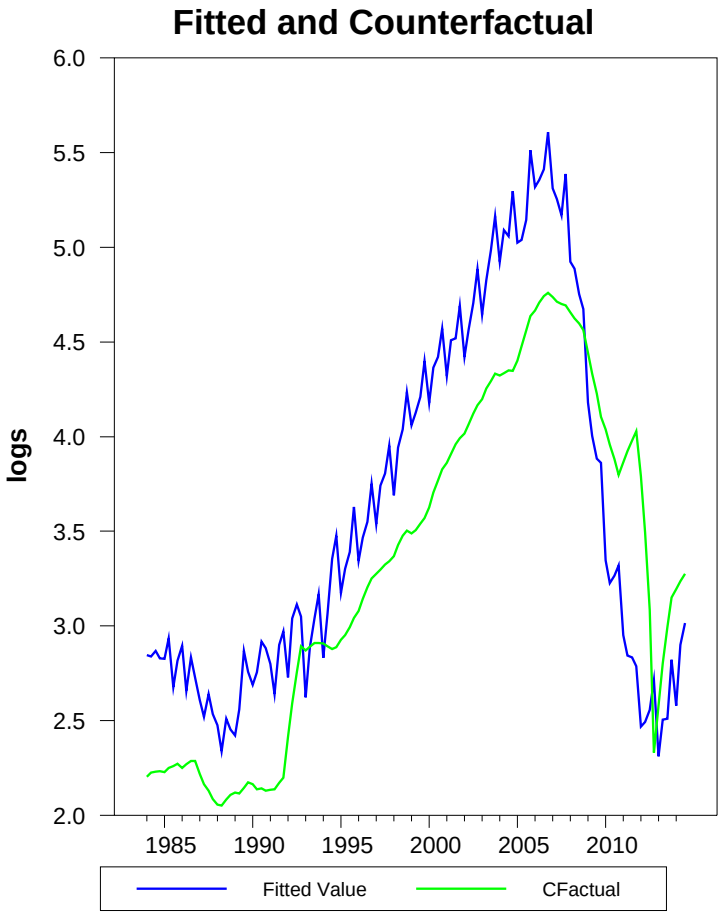


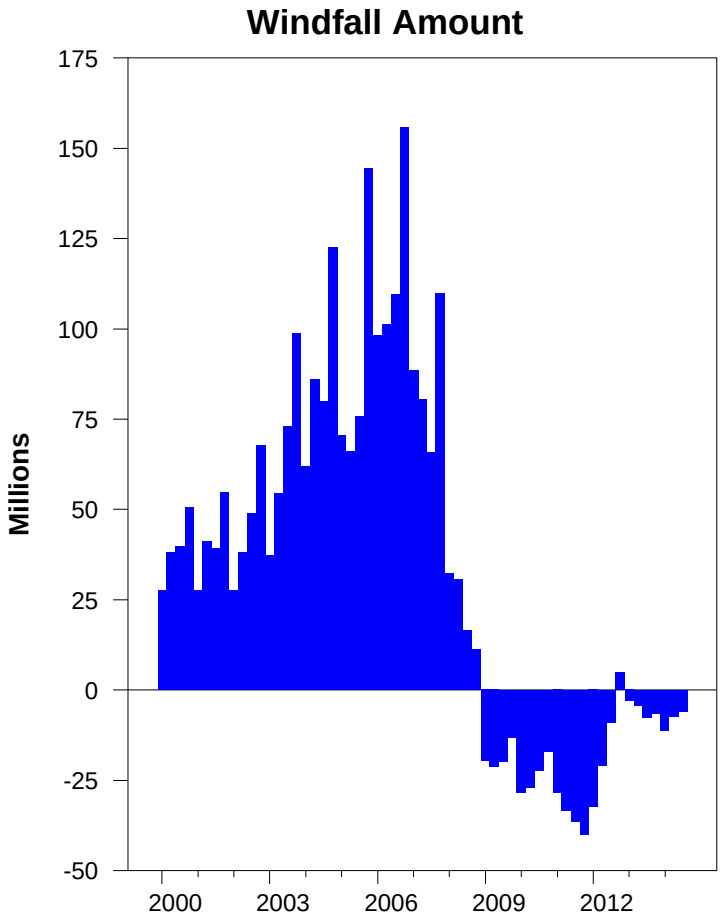
Windfall Estimates for Capital Gains Tax



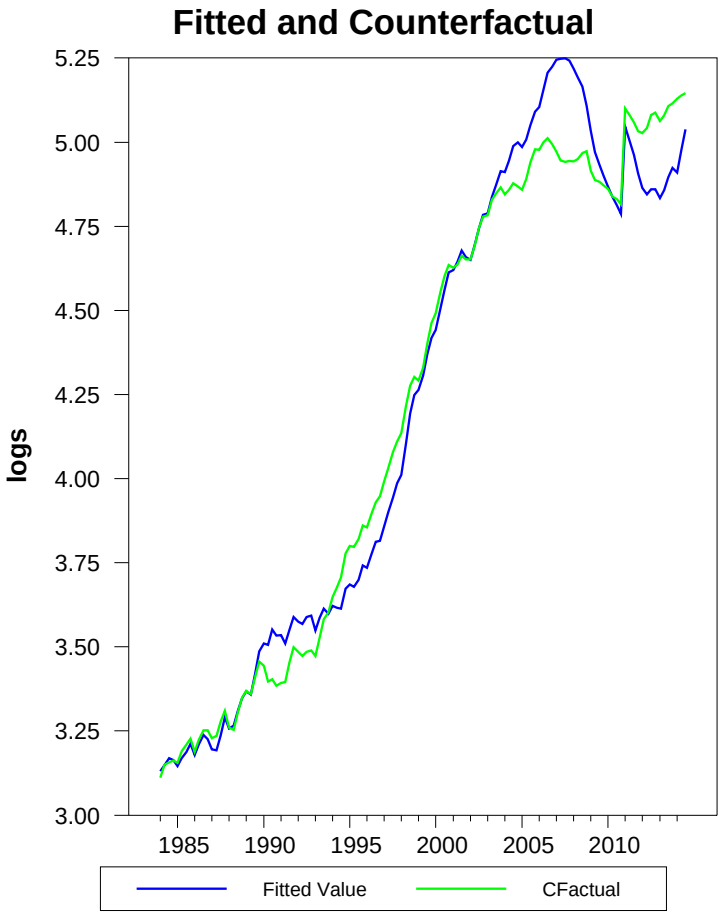


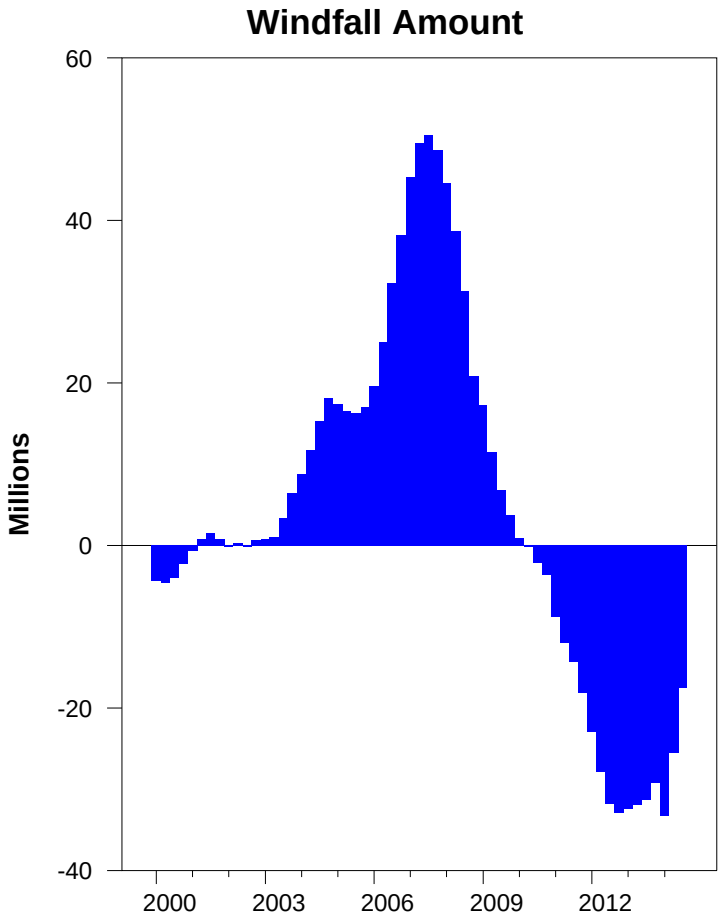
Windfall Estimates for Stamp Duty





Windfall Estimates for VAT





Actual and Windfall Levels (Average and Total) €(m)

Table: Average Quarterly Actual and Windfall Levels €(m)

Period	CGT			Stamp Duty			VAT		
	Actual	Windfall	%	Actual	Windfall	%	Actual	Windfall	%
2006 - 2008	114.1	37.3	33	234.5	74.9	32	206.8	37.1	18
2010 - 2013	19.2	-9.9	-52	16.5	-19.5	-118	137.4	-18 .7	-14

Table: Total Actual and Windfall Levels €(m)

Period	Actual			Windfall			
	CGT	Stamps	VAT	CGT	Stamps	VAT	%
2006 - 2008	1,368.9	2,814.4	2,481.2	447.1	899.4	445.1	27
2010 - 2013	307.1	264.1	2,199.1	-158.7	-311.9	-298.6	-28

Implications for the Fiscal Framework?

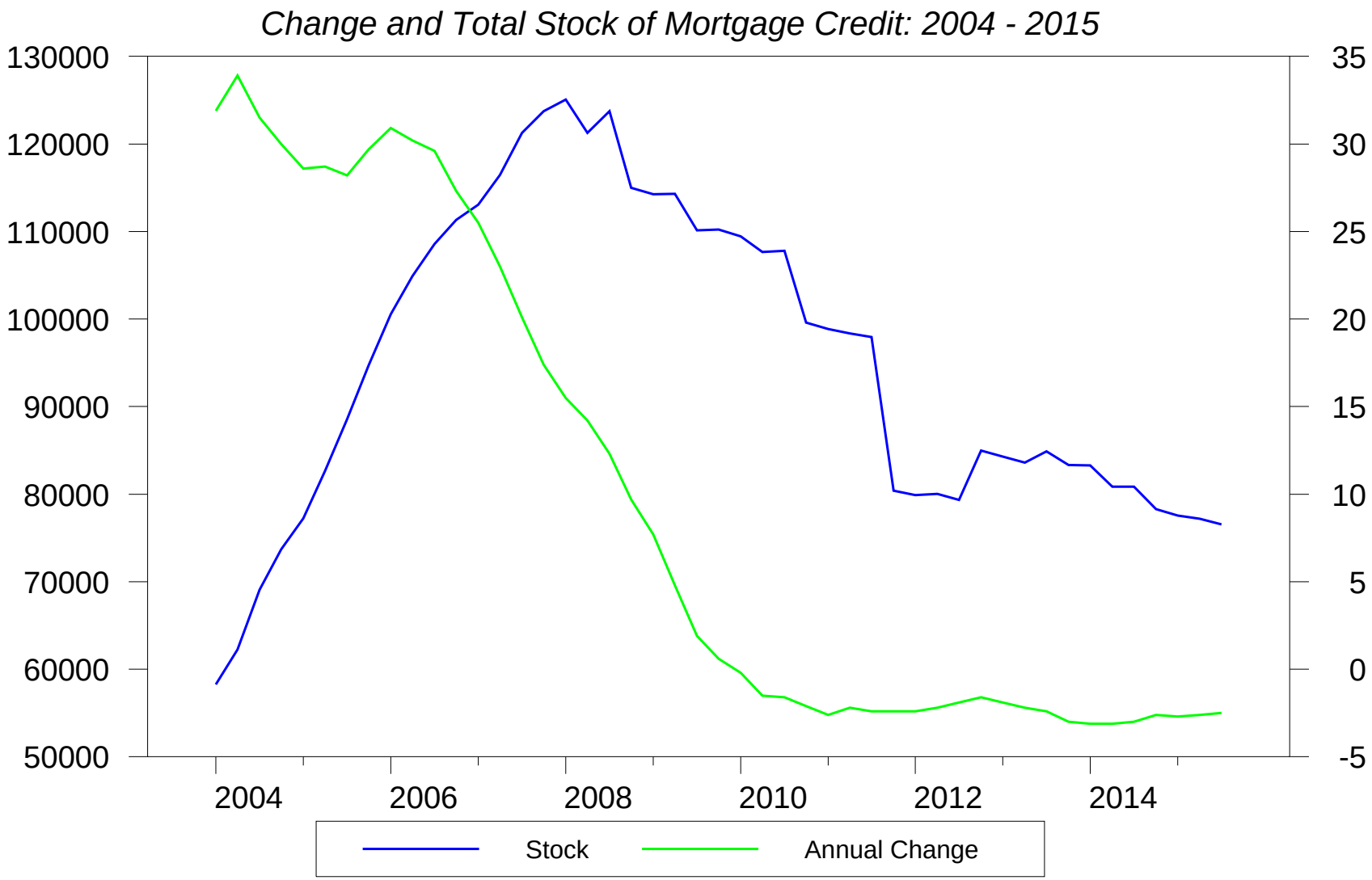
- Strengthened fiscal framework (SGP)
- Gives prominence to headline aggregate concepts
  - GG balance, structural budget balance, GG debt to GDP
- Also, many countries have set-up fiscal councils
  - While these do improve fiscal discipline
- Irish experience argues for a parallel granular approach
  - Would GG deficit (and debt) ratios reflect
  - Underlying weakness of the public finances circa 2007?

Concluding Comments

- Over the past 30 years a number of periods where
  - Where housing market dis-equilibria has
  - Impacted on the public finances
- Concept of windfall gains is quite popular
- However, the post 2007 *overcorrection* of the property market
  - Related taxes artificially low?
  - Concept of windfall *losses*.
- Structural deficit overstated as a consequence?
- Modelling key taxation aggregates - forecasting perspective
  - IFAC working paper (Hannon, Leahy & O'Sullivan (2015)).

Thank You

Irish Mortgage Credit Market



Breaking out the housing related component

- Exchequer tax data (1984 - present)
  - Seasonally adjusted
- Focus on property dependent taxes
  - VAT, stamps and CGT
- Breaking out property-related component:
  - Revenue Commissioners and Department of Finance data

Computing Exogenous Components of LTI and LTV

	$\triangle LTI_{raw_t}$	$\triangle LTV_{raw_t}$
$\triangle HPrices_{t-1}$	1.172	
	(3.4)	
$\triangle HPrices_{t-3}$	-0.559	-0.305
	-1.9	(-2.0)
$\triangle HPrices_{t-4}$		0.568
		(2.8)
$\triangle Income_t$	-1.113	-0.283
	(-4.4)	(-1.8)
$\triangle Income_{t-3}$		0.356
		(1.8)
$\triangle Income_{t-4}$	0.775	
	(1.8)	
$\triangle URate_{t-3}$	-0.182	
	(-1.8)	
$\triangle MorRate_{t-2}$		-0.009
		(-1.7)
$\triangle MorRate_{t-4}$		-0.01
		(-2.1)
Adj.R2	0.576	0.495
Sample	1988q1-2013q4	1988q1-2013q4

Mortgage Supply

- Assume banking sector is monopolistically competitive so
  - Lending rates are set as a (variable) markup over funding costs
  - Funding costs given by deposit rate and money market rate
- Markup determined by risk and balance sheet factors
- Risks:
  - Household specific, macroeconomic environment and
  - Liability structure
- ECM framework where the long-run equation:

$$MorRate_t = \alpha + \beta_1 MMRate_t + \beta_2 DepRate_t + \beta_3 HHEquity_t + \beta_4 URate_t + \beta_5 LTD_t + \varepsilon$$

Housing Demand (House Prices)

- Inverted demand for housing
- Demand for housing services =
  - f(Disposable income, user cost, credit conditions, unemployment)
- Composite house price index using DoECLG, ESRI and CSO data
- ECM framework. Long-run estimated as:

$$HPrices_t = \alpha + \beta_1(HStock_t/Pop2534_t) + \beta_2 Income_t + \beta_3 User_t + \beta_4(MorStock_t/Income_t) + \epsilon_t$$

Housing Supply

- Profitability of investment (Tobin's Q)
  - House price-Building cost ratio
  - proxies value of housing relative to its replacement cost
- Two credit channels
  - User cost of capital (real nfc lending rate)
  - Credit conditions (construction credit growth rate)
- Output gap capture macroeconomic uncertainty

$$Completions_t = \alpha + \beta_1 Completions_{t-1} + \beta_2 (HPrice_t / BCost_t) + \beta_3 NFCRate_t + \beta_4 \triangle CLoans_t + \beta_5 Gap_t + \beta_6 Insolv_t + \epsilon_t$$

- Housing Stock follows perpetual inventory approach

Supply and Demand in the Irish Mortgage Market

Mortgage Demand		Mortgage Supply	
	$NewMortgages_t$		$\triangle MorRate_t$
$NewMortgages_{t-1}$	0.672	$MorRate_{t-1}$	-0.544
	(19.5)		(-6.7)
$RMorRate_t$	-0.025	$HHEquity_{t-1}$	-0.541
	(-7.2)		(-4.1)
$\triangle Income_t$	0.782	$URate_{t-1}$	0.423
	(2.9)		(8.1)
$\triangle HPrices_{t-1}$	0.534	$DepRate_{t-1}$	0.136
	(3.5)		(5.8)
LTV_t	0.749	$MMRate_{t-1}$	0.429
	(4.5)		(21.5)
LTI_t	0.371	LTD_{t-1}	-0.906
	(6.0)		(-8.2)
$Spread_t$	-0.063	$\triangle MMRate_t$	0.451
	(-6.1)		(9.2)
Constant	7.048	$\triangle DepRate_{t-1}$	0.128
	(-9.8)		(2.9)
		Constant	-0.013
			(-0.6)
Adj. R^2	0.991	Adj. R^2	0.891
Sample	1988q1-2013Q4	Sample	1988q1-2013q4

Supply and Demand in the Irish Housing Market

Housing Demand		Housing Supply	
	$\triangle HPrices_t$		$Completions_t$
$HPrices_{t-1}$	-0.223	$Completions_{t-1}$	0.754
	(-4.5)		(15.2)
$HStock_{t-1}/Pop2534_{t-1}$	-0.27	$HPrices_t/BCosts_t$	0.177
	(-20.5)		(3.0)
$UserCost_{t-1}$	-0.002	$NFCRate_t$	-0.022
	(-13.5)		(-2.4)
$Income_{t-1}$	0.206	$InsolvRate_t$	-0.094
	(13.4)		(-5.4)
$MorStock_{t-1}/Income_{t-1}$	0.096	Gap_t	-1.302
	(16.0)		(-4.4)
$\triangle Income_{t-1}$	0.173	$\triangle ConstLoans_{t-1}$	0.509
	(2.5)		(2.8)
$\triangle(MorStock_{t-1}/Income_{t-1})$	0.205	Constant	1.248
	(2.2)		(5.8)
$\triangle URate_t$	-0.098		
	(-2.3)		
$\triangle URate_{t-1}$	-0.097		
	(-2.2)		
Constant	-0.007		
	(-2.8)		
Adj. R^2	0.783	Adj. R^2	0.984
Sample	1988q1-2013Q4	Sample	1988q1-2013q4

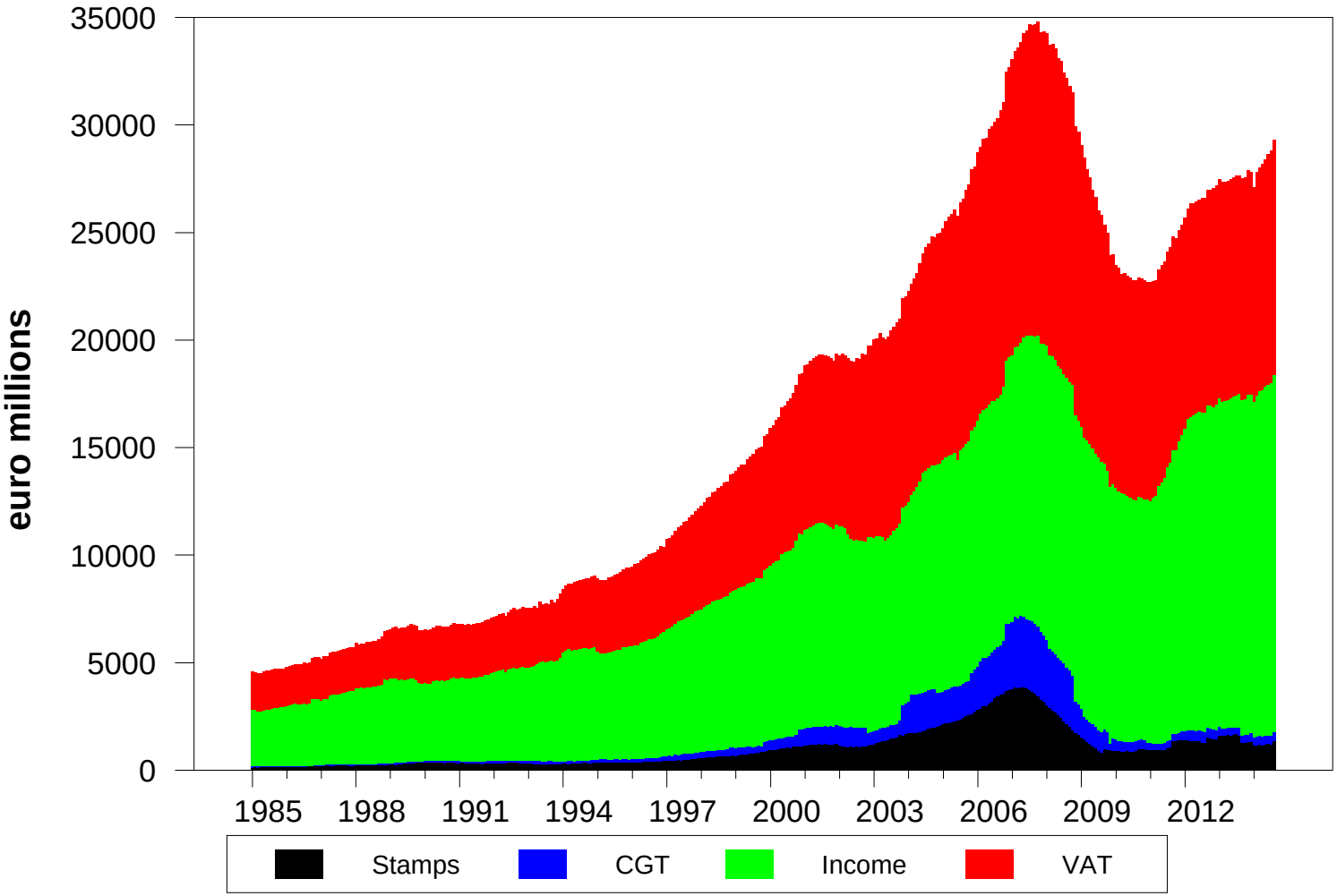
Simulating the Potential Impact of Mortgage Restrictions

- Model used to simulate the impact of mortgage proposals
  - Assumptions required as to how restrictions affect average LTV and LTI
- CBI (2014) shows distribution of mortgages by LTV and LTI

LTV	% Vol. New Mortgages	LTI	% Vol. New Mortgages
Over 90%	12	Over 4.5	7
Between 85 and 90%	23	Between 4 and 4.5	6
Between 80 and 85%	9	Between 3.5 and 4	10
80% and below	56	3.5 and below	77

  - Weighted average LTV and LTI are 84% and 3.6 respectively
- High-LTV and high-LTI borrowers "displaced" by restrictions?
  - Assume 25% and 50% of potential high-LTV/LTI borrowers exit mortgage market
  - Average LTV falls by 8 and 14 percentage points
  - Average LTI falls by 0.04 and 0.07

Annualised Select Exchequer Taxes: 1985-2014



Budget Balance Ratios