

Addison-Smyth, Diarmaid; McQuinn, Kieran

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**Assessing the Sustainable Nature of Housing-Related  
Taxation Receipts: The Case of Ireland**

**Diarmaid Addison-Smyth\* and  
Kieran McQuinn<sup>a</sup>**

*Abstract:* Even by international standards, Ireland's fiscal position was particularly affected by the recent financial crisis. As budgetary surpluses quickly gave way to significant deficits post 2007, the deterioration in the Irish public finances culminated in an Excessive Deficit Procedure being launched in 2009 and entry into a formal EU/IMF assistance programme in late 2010. Much of this deterioration was caused by the sudden and sharp decline in the Irish housing market as property-related taxes dried up. In this paper we quantify the extent of housing related tax windfall gains and losses. We find that at various times over the past three decades, there have been instances where dis-equilibrium in the Irish housing market has had significant implications for the associated taxation receipts. Examining taxation aggregates in this manner can be seen as an important complement to recent policy responses aimed at improving fiscal governance.

*Keyword(s):* Fiscal, House Prices, Sustainable

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*\*Central Bank of Ireland*

*<sup>a</sup>The Economic & Social Research Institute,  
Dublin*

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# 1 Introduction

The impact of the financial crisis of 2008/09 on the Irish public finances was arguably greater than for any other country in the OECD. The Irish economy had exhibited particularly strong budgetary performances vis-à-vis other European countries in the lead up to the crisis; over the period 2005 - 2007 the Irish Government recorded a General Government (GG) budget surplus in each year of 1.3, 2.8 and 0.3 per cent of GDP respectively, while the GG debt to GDP ratio had, in 2006, fallen to less than 24 per cent.<sup>1</sup> However, the crisis precipitated an alarming deterioration in the Irish public finances with the debt to GDP ratio quickly escalating to a peak of 123 per cent in 2013.<sup>2</sup>

One of the main sources for this rapid, adverse transformation in the public finances was the over-reliance of Irish budgetary receipts on the booming housing market. In the decade preceding the financial crisis, Irish house price growth was larger than that in any other western economy. This significant period of house price growth was also accompanied by a sustained increase in housing supply. For instance, Irish housing supply over the period 2005 - 2007 averaged approximately 84,000 units per annum. This compares with an average at the same time in the UK of 210,000 units - just over a twofold difference, despite a fourteen fold differential in population levels.

The impact of property market developments was compounded by the nature of the Irish taxation system at this point; stamp duty and VAT receipts, in particular, were collected as a fixed percentage of the house price. Therefore, as prices and volumes sold increased substantially so too did the taxation receipts. However, much of this increase was subsequently proven to have been unsustainable. House prices by 2007 were commonly acknowledged to have been overvalued by between 30 to 35 per cent.<sup>3</sup> The onset of the international financial crisis triggered one of the largest corrections in house prices observed across the OECD; between 2007 and 2012 Irish house prices fell by 50 per cent in nominal terms.

In this paper, we attempt to quantify the extent of housing related tax windfall gains and losses

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<sup>1</sup>To put these numbers in an international context, over the 2005-2007 period the GG budget balance in Germany averaged -1.5 per cent of GDP, with the debt to GDP ratio averaging 66 per cent.

<sup>2</sup>The GG balance figures for Ireland refer to the balance excluding the impact of the different banking capitalisation measures which took place. These were particularly large between 2009 and 2011 amounting to a cumulative 27.5 per cent of GDP.

<sup>3</sup>See Honohan (2010) for more on this.

accruing to the Irish Exchequer over a thirty year period as a result of disequilibrium in the housing market. This involves a three-step modelling approach where we relate property dependent taxes to the housing market while estimating equilibrium in the latter before solving for the tax take consistent with that equilibrium. In so doing, we find that the fiscal position compatible with equilibrium in the housing market has on several occasions, but particularly in the recent period, diverged greatly from actual outturns. This has important implications for both budgetary policy (tax and expenditure planning) and fiscal governance.

The significant deterioration in the public finances of many countries as a result of the financial crisis inevitably led to the adoption of measures seeking more sustainable public finances. At a European level, a range of initiatives have been undertaken over the past number of years to strengthen the Stability and Growth pact. This has seen the emergence of more fiscal rules (with stricter caps on government spending and borrowing) and much greater levels of macroeconomic and fiscal surveillance. One of the main goals of the fiscal rules is to constrain discretion amongst policy-makers through setting explicit quantitative limits on relevant fiscal aggregates. A further development has been the increase in the number of independent fiscal institutions/councils across the EU.

While the mandates of fiscal councils differ across countries<sup>4</sup>, typically they involve these bodies focusing on well-established fiscal and macroeconomic aggregates such as GDP growth, the GG balance, the government debt to GDP ratio and government expenditure and revenue aggregates. Fiscal councils may also be tasked with assessing cyclically adjusted metrics such as movements in the structural budget balance.

While the range of measures initiated in the EU to strengthen fiscal frameworks are clearly important, we argue that they are not, in themselves, fully sufficient to identify underlying fiscal vulnerabilities. For example, we contend that the application of the current set of fiscal rules in an Irish context in the period immediately preceding the financial crisis *would not* have revealed the fiscal fragilities which self-evidently existed in the economy at that time. Thus, it is important to

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<sup>4</sup>Hagemann (2011) places fiscal councils in three broad categories. The first set includes bodies that provide independent forecasts used in the formulation of the budget such as the Office of Budget Responsibility in the UK. The second set includes bodies that provide normative views on fiscal policy (e.g. the Irish Fiscal Advisory Council) and a third set includes bodies that provide independent forecasts of macroeconomic and budgetary variables needed in the annual budget (e.g. the Netherlands Bureau for Economic Policy Analysis).

complement standard measures of assessing fiscal developments with the more granular approach presented here. Specifically, we argue for the need to more closely link important taxation aggregates to underlying sustainable economic activity (including housing market developments). Such an approach enables a deeper and richer assessment of the sustainability of taxation receipts.

The rest of the paper is structured as follows. In Section 2, we provide some background to fiscal and housing market developments over the past three decades. Data sources and the modelling framework are outlined in Section 3, while in Section 4 we estimate housing-related tax windfalls over a thirty year time horizon. Some implications for fiscal policy formulation and governance are set out in Section 5 while Section 6 offers some concluding thoughts.

## **2 Background to Fiscal and Housing Market Developments**

### **2.1 Fiscal Developments 1984 - 2014**

The past three decades have been turbulent for the Irish public finances. The GG budget balance and the debt to GDP ratios are plotted in Figures 1 and 2 respectively.<sup>5</sup> (The Exchequer borrowing requirement is also shown for completeness.) We identify three broad eras in this paper. From 1985 to 2002, the public finances steadily improved as the economy grew - the latter half of which included the Celtic Tiger era. We refer to this as the convergence period. From 2003 to 2007, the fiscal position dramatically improved helped in part by the bubble in the housing market. Between 2008 and 2010, the public finances went into free-fall with the onset of the financial and housing market crisis. This resulted in Ireland being placed in an Excessive Deficit Procedure (EDP) in 2009 and ultimately having to enter into a formal EU/IMF assistance programme in late 2010. The period post-2010 has seen a steady recovery in the public finances as government receipts and expenditure were brought under control following a series of consolidation budgets. By 2014, the deficit had fallen to an estimated 4.1 per cent of GDP (from a peak of 11.7 per cent in 2009).

Fiscal developments can also be neatly summarised from Exchequer tax data.<sup>6</sup> In Figure 3, we plot annualised select Exchequer taxes by tax type. Tax receipts increased by 8.6 per cent per

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<sup>5</sup>The underlying GG balance is shown in Figure 1.

<sup>6</sup>Exchequer tax receipts capture cash inflows into central government. This is a narrower concept than GG taxes as these encompass inflows into all arms of Government (central, local, non-commercial state sponsored bodies, etc.) For example, in 2013, Exchequer taxes in Ireland amounted to about 90 per cent of GG taxes.

annum during the convergence era to 2002, before picking up markedly to growth of 10.1 per cent per annum from 2003 to 2007. Taxes fell very sharply from 2008, contracting in each of the years to 2010 before growth resumed in 2011.

## **2.2 Housing Market Developments 1984 - 2014**

The rise and fall of the Irish housing market has been well documented (see for example, McCarthy and McQuinn (2013a)). Briefly, the housing bubble was driven by very robust growth in employment, incomes and benign monetary financing conditions. Real Irish house prices grew by nearly 9 per cent per annum between 1995 and 2007. Based on international data provided by the Federal Reserve Bank of Dallas, the increase in Irish house prices over this period (at a cumulative 174.5 per cent) was the largest in a sample of 22 countries (for example, over the same period house prices increased by 114.5 per cent in the UK, by 72.7 per cent in the US and by -2.8 per cent in Germany). While the initial phase of the Irish housing boom was driven by developments in key market fundamentals, from 2003/04 onwards, the emergence of a classic credit bubble further stimulated the housing market.

House construction levels soared with annual house completions averaging 84,000 units between 2004 and 2006. This resulted in the investment to GDP ratio in Ireland rising to 29.2 per cent in 2006 (relative to 22.0 per cent in the EU).<sup>7</sup> Employment levels in construction increased by two thirds between 2000 and 2007. As a result, by early 2008, approximately 1 in 8 workers were employed in the construction sector in Ireland, relative to 1 in 12 in the EU.

The housing market collapse began in 2008, with prices declining on average by 12.7 per cent in nominal terms in each of the years to 2013. Annual house completions dropped by 91 per cent (from a peak of 93,400 units in 2006) to a low of 8,300 units in 2013 (Figure 4). The number of persons employed in the construction sector dropped by nearly two thirds with a consequent sharp rise in the rate of unemployment. This dramatic fall in housing market activity resulted in significant economy-wide difficulties most notably in mortgage markets and in terms of the public finances. It is the latter effect that is focused on here.

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<sup>7</sup>Between 2003 and 2007, investment in housing in Ireland averaged 12.9 per cent of GDP, more than double the European average.

## 3 Data and Modelling Approach

### 3.1 Property Related Taxes

Three of the main tax heads - stamp duty, capital gains tax (CGT) and VAT receipts are heavily affected by activity levels within the housing market.<sup>8</sup> These taxes recorded exceptionally strong annual rates of increase over the housing market bubble period (2003-07) as can be seen from both Table 2 and Figure 3. It is also noteworthy that all of these taxes increased their share of the tax take, even at a time of very robust growth in overall taxes.

The figures in Table 2 are also likely to understate the importance of the housing market to the tax take as no allowance is made for indirect effects. These include income taxes raised from construction, ancillary services (real estate, legal and banking, company profits, etc.) as well as multiplier effects. As regards the latter, one very important channel in an Irish context is the degree to which housing market developments impact on consumption decisions (see McQuinn and McCarthy (2013b)).<sup>9</sup>

In Ireland, there is no formal published data available for taxation receipts attributable to the housing market. However, using tax data published by different sources, we have subdivided stamp duty, CGT and VAT into housing and non-housing related components.<sup>10</sup> The approaches taken for each tax head are outlined below.

### 3.2 Stamp Duty

Stamp duties are payable on a wide range of legal and commercial documents, including conveyances of property, leases of property and shares. Much of the increase in stamp duty receipts from 2003 to 2007 (receipts effectively doubled in absolute terms) reflected activity levels within the housing market. Based on data from the Revenue Commissioners, we can apportion stamp duty receipts to a number of broad categories. These include property related activities, share transactions as well as a range of levies (including the pension levy in recent years). Using this

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<sup>8</sup>Up until the introduction of the local property tax in Ireland in 2013, there was no one specific property tax.

<sup>9</sup>Based on a representative sample of mortgaged Irish households, McCarthy and McQuinn (2013b) find a relatively large wealth effect for housing wealth when compared with similar studies.

<sup>10</sup>Specifically we draw on data from the Department of Finance (Exchequer returns) and tax reports of the Office of the Revenue Commissioners.

approach we were able to derive a housing related stamp duty series.

### **3.3 Capital Gains Tax**

CGT are payable on gains made from the sale of assets including housing. Data from the Revenue Commissioners allows us to apportion CGT to various categories. These include residential property transactions, land sales, share dealings as well as various funds and smaller asset classes. Based on the number of residential property transactions we derived a housing related CGT series.

### **3.4 VAT**

VAT is the second most important source of tax revenue (after income tax) in Ireland and is payable on new housing at the lower rate of 13.5 per cent. The Revenue Commissioners provide data on VAT payments by sector. These include “real estate” and “construction” activities.<sup>11</sup> Using this approach, we were able to derive a housing related VAT series.

By applying the aforementioned adjustments, we were able to derive housing dependent tax series for the three tax heads. These are plotted in Figure 5. The data are monthly and run from 1984 to mid-2014. As the data are highly seasonal, all of the series were first seasonally adjusted using the TRAMO/SEATS adjustment programme (Gomez and Maravall, 1996).

### **3.5 Some other relevant studies**

Before proceeding with the modelling approach it is worthwhile to briefly review some relevant literature. The challenges and issues faced in the area of fiscal forecasting are highlighted in a comprehensive paper by Leal et al. (2008). They note the increasing attention paid to (and the importance of) budgetary forecasts. The authors also question how well tax bases are being adequately captured in standard fiscal models and the potential for errors in the base to translate into systematic tax revenue forecast errors. Morris and Schuknecht (2007), in examining the relationship between asset prices and government revenues across a number of OECD countries, find that asset prices are a significant factor in accounting for movements in cyclically adjusted budget balances. The authors recommend that much greater attention be paid to asset price

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<sup>11</sup>We also examined VAT registrations data published by the Revenue Commissioners.



movements when assessing fiscal policy. In a study of tax windfalls across a range of EU countries, Morris et al (2009) find that profit related taxes and housing market developments are significant factors. Barrios and Rizza (2010), in a study of unexpected changes in tax revenue across the EU over a ten-year period, also find that asset price fluctuations are a significant factor in a number of countries (namely, in Ireland, Spain, the UK and Finland). In the US, Lutz (2008) finds that property taxes are quite sensitive to changes in house prices albeit with significant lags. In a study of tax receipts in Californian cities, Vlaicu and Whalley (2011) report a strong relationship between house price movements and property tax revenue.

In an Irish context, Addison-Smyth and McQuinn (2010) estimated property related tax windfalls over an eight year period to 2009 and found significant divergences between actual tax receipts and receipts warranted by housing market fundamentals. This resulted in, at times, a large gap between headline fiscal ratios and those consistent with equilibrium in the housing market. Kandra (2010) examined estimates of the structural balance for Ireland and found that asset price cycles (and sectoral changes) exerted a significant influence on estimates of structural fiscal revenues.

## 4 Empirical Approach

The aim of this paper is to estimate the property windfall component of tax revenue receipts as a result of disequilibrium in the Irish housing market. To do this we model the tax components as a function of variables proxying for activity in the housing sector. We then estimate what the “fundamental” level of activity would have been in the Irish housing sector over the period 1984 - 2014. By the “fundamental” estimate, we mean the long-run amount, which is compatible with the level of key economic variables, such as interest rates, income levels and demographics, over the period. Using the models for the taxation items, we then solve for the taxation receipts compatible with the sustainable level of activity in the housing market. The difference between this level and actual receipts constitutes the *revenue windfall*. For activity levels in the housing market we use both house prices and completions data as proxies.<sup>12</sup>

In summary, there are three stages in the modelling approach:

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<sup>12</sup>We also used mortgage level indicators such as average mortgage amount drawn down and average mortgage approved, however our results were broadly unchanged.

1. We model property related (VAT, CGT and stamp duty) tax receipts as a function of activity levels within the housing market.
2. We take the results of an existing model of Irish property prices to estimate a fundamental or long-run Irish house price. We also decide on a long-run sustainable level of housing supply.
3. Using a combination of the different models, we solve for tax receipts consistent with equilibrium in the housing market and compare this to the actual tax take. The gap between the actual and fundamental tax series allows us to quantify tax windfalls.

#### 4.1 Modelling House Prices

In modelling both house prices and tax receipts the following variables are used:

$P_t$  = actual house prices.

$Y_t$  = disposable income.

$POP_t$  = Irish population.

$UC_t$  = user cost of Irish housing.

$R_t$  = mortgage interest rate.

$C_t$  = actual housing related capital gains receipts.

$S_t$  = actual housing related stamp duty receipts.

$V_t$  = actual housing related VAT receipts.

$H_t$  = actual housing completions.

The data is quarterly and covers the period from 1984 to mid-2014. House price data is taken from the Central Statistics Office (CSO) official house price index. For years prior to 2005, we “backcast” the series using the Department of the Environment’s housing statistics database.<sup>13</sup>

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<sup>13</sup>Formally the Department of the Environment, Heritage and Local Government.

House completions data is taken from the same source. Data on interest rates and disposable income levels are taken from the macroeconomic database of the Central Bank of Ireland. In Table 3, we report a summary of our data, where the taxation item now refers specifically to the housing related component, while in Table 4 standard unit root and cointegration tests are presented. For all variables, the null hypothesis of a unit root can not be rejected, while the null hypothesis of no cointegration between the tax aggregate and the housing variables is rejected in all cases.

## 4.2 Modelling Tax Components

The three housing specific tax components of CGT, stamp duty and VAT, which we denote by the vector  $(Q_t)$ , are specified as a function of house prices and supply:

$$Q_t = f(P_t, H_t). \quad (1)$$

We model all three items in a log-linear manner, where lower cases denotes the variable is in logs:

$$c_t = \gamma_0 + \gamma_1 p_t + \gamma_2 h_t + \epsilon_t. \quad (2)$$

$$v_t = \alpha_0 + \alpha_1 p_t + \alpha_2 h_t + \epsilon_t. \quad (3)$$

$$s_t = \beta_0 + \beta_1 p_t + \beta_2 h_t + \epsilon_t. \quad (4)$$

The results from the long run estimation are shown in Table 5.<sup>14</sup> In the interests of robustness, we use three different estimators to estimate (1) - standard OLS, dynamic OLS (DOLS), and the ARDL approach by Pesaran, Shin and Smith (2001). Hyashi (2000), amongst others, have noted the difficulties associated with inference based on t-stats estimated with OLS. The use of alternative estimators such as DOLS and ARDL enables inference to be based on standard errors

<sup>14</sup>Note we also looked at changes in the taxation system by examining annual budget statements. In certain circumstances, such as for VAT between 2011 and 2014, we use dummy variables to proxy for changes in taxation policy.

adjusted for considerations such as correlation between the regressors and the error process and serial correlation.<sup>15</sup>

For both CGT and stamp duty the housing activity variable was found to be highly significant. For VAT however, only the house price series proved to be significant in the case of the DOLS and ARDL estimators.<sup>16</sup> As the estimation is in logs, all coefficients can be interpreted as elasticities. Across the different estimators, the observed similarity in the magnitude of the coefficients is reassuring. In Figure 6, we plot the actual tax levels with the fitted values for each of the three taxation aggregates based on the regressions. From the Figure, the fitted values can be seen to track the actual levels quite closely encompassing both the housing bubble and the subsequent collapse.

Given the cointegrating relationship, we also estimate three short-run models based on the long-run estimates in Table 5. The results point to significant error correction in all three cases, but with different speeds of adjustment. In the cases of VAT and stamp duty, any disequilibrium is corrected for quite quickly (Table 6) with the error correction term in the CGT model indicating that any disequilibrium adjusts by over 50 per cent per quarter.

### **4.3 Quantifying Housing Market Disequilibria**

To estimate the sustainable level of taxation receipts, we need an estimate of the fundamental level of both of our housing market activity variables; house prices and supply over the sample period. In the case of property prices, we use the fitted values from a standard house price model, popular in the international literature. The approach, which can be observed in an Irish context in Kelly and McQuinn (2014) and McQuinn (2014), involves inverting the demand function for housing and rearranging such that the dependent variable is now the price of housing as opposed to the quantity. Similar applications can be observed in Cameron, Muellbauer and Murphy (2006), Muellbauer and Murphy (1997), Muellbauer and Murphy (1994), Meen (1996, 2000), Peek and Wilcox (1991). The model, which assumes that the demand for housing services is proportional

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<sup>15</sup>Note the earlier paper by Addison-Smyth and McQuinn (2010) also used these estimators in looking at similar type relationships in an Irish context.

<sup>16</sup>This might reflect the fact that VAT is payable on new housing whereas CGT and stamp duties are payable on all housing transactions.

to the housing stock, can be derived, in log linear fashion, as follows:

$$\ln\left(\frac{h}{pop}\right) = \alpha_1 \ln\left(\frac{y}{pop}\right) - \alpha_2 \ln rent + \alpha_3 \ln pop. \quad (5)$$

where  $h$  is the housing stock,  $pop$  is the population level,  $y$  is disposable income and  $rent$  is the real rental rate of housing in the economy. The coefficients  $\alpha_1$  and  $\alpha_2$  are the income and price elasticities of demand for housing. In equilibrium, the real rental rate of housing can be assumed to be equal to the real user cost. This can be outlined as follows:

$$p(r - p^e/p) \equiv p \times uc. \quad (6)$$

where  $r$  is the mortgage interest rate,  $p$  is house prices,  $e$  denotes expectations and  $uc$  is the user cost of housing. While expressions for the user cost can be augmented to include taxation considerations and expenditure rates of maintenance and repair, very often, the main determinants of the expression are the mortgage rate and expected house price inflation.<sup>17</sup> Thus, substituting (6) into (5) provides the following inverted demand equation for housing:

$$\ln p = \frac{\alpha_1}{\alpha_2} \ln\left(\frac{y}{pop}\right) - \frac{1}{\alpha_2} \ln\left(\frac{h}{pop}\right) - \ln uc + \frac{\alpha_3}{\alpha_2} \ln pop. \quad (7)$$

House prices are positively related to real income per capita and population levels and negatively related to the per capita housing stock and the user cost of capital.

Given the extent to which housing market developments constituted a disproportionate component of overall economic activity in Ireland (notably between 2003 and 2007), one issue which may arise with (7) is the potential endogeneity of the income variable ( $\frac{y}{pop}$ ) - we address this issue in an appendix to the paper (Annex A).

The actual and fitted value for (7) are shown in Figure 7 along with the difference.<sup>18</sup> In McQuinn (2014), the results from (7) are compared with those of three other house price models. In general, as can be seen from McQuinn (2014), the overall result concerning the degree of

<sup>17</sup>In calculating the user cost expression, Kelly and McQuinn (2014) use a variety of different house price expectations mechanisms, however they find that their results do not change on the basis of the different assumptions.

<sup>18</sup>Full regression results are available, upon request, from the authors.

over/undervaluation is quite similar across the models in question. Therefore, we are not concerned that the estimated housing market disequilibria is unduly *model-specific*.

In generating a “fundamental” based estimate of housing supply, we adopt the recent approach of Duffy, Byrne and FitzGerald (2014). Based on likely future demographic trends, Duffy et al. (2014) conclude that 25,000 housing units per annum are required over the next 15 years to meet the underlying demand in the Irish market. The approach, based on micro level data, involves generating estimates of independent households as the product of population forecasts and headship rate forecasts. The headship rate provides a measure of the rate of household formation and is the proportion of individuals in an age cohort that list themselves as “head of household” or “principal reference person” in the Irish Census or in the Quarterly National Household Survey (QNHS), both of which are published by the CSO. While Duffy et al. (2014) are concerned with providing forecasts of future household levels and housing requirements, we use the approach to generate the number of independent households in the Irish economy over the period 1983 to the present.<sup>19</sup>

The difference between the actual level of supply and this fundamental level is plotted in Figure 8. It is clear that while changes in both headship rates and population levels suggested an increase was warranted in Irish housing supply levels from 2000 to 2007, the actual increase observed was considerably in excess of this level.

Taking the long-run results from (7) and our long-run supply estimate, we solve for the level of (housing related) taxation receipts consistent with equilibrium in the housing market over the period 1984-2013. The results are shown in Figures 9, 10 and 11 for each of the three tax heads. A very similar pattern emerges. Each of the taxes tends to track the fundamental series closely up until 2002, thereafter, a growing divergence emerges between the actual tax take and the sustainable level suggested by the models. The excess tax receipts between 2003 and 2008 are termed as transitory “revenue windfalls”. From 2008 onwards the actual tax series declines rapidly; even more than that suggested by the models with actual receipts *below* fundamental levels from 2009 onwards. We deem these shortfalls “negative windfalls”.

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<sup>19</sup>For the 1980s, this involves interpolating the number of households from the 1981, 1986 and 1991 censuses, while post 1991 we use estimates from the ESRI HERMES model. See FitzGerald et al. (2008) for more details on this.

The Figures 9 - 11 suggest that the revenue windfalls reached a peak during the period 2006 - 2008, while the negative windfalls were largest for the latter period 2010 - 2013. In Table (7) we summarise the average quarterly actual and windfall tax levels for these two sub-periods. Our estimates suggest that positive windfalls ranged from 30 to 54 per cent of the actual amount over this period, while, over the period 2010-2013, the negative windfall ranged from 11 to 21 per cent of the relevant taxation aggregate. For stamp duty, it is clear that over the recent period, the negative windfalls were considerably larger than the actual amount collected. In total, our estimates point to an average annual positive tax windfall of 44 per cent (of the housing related tax take) between 2006 and 2008 and a negative windfall of 27 per cent between 2010 and 2013.

From a broader fiscal perspective, these results mean that headline fiscal ratios (such as the GG balance as well as cyclically adjusted variants) are likely to have been distorted with the level of distortion linked to the degree of disequilibrium in the housing market. Over the housing bubble period (2003-07), our estimates suggest that the GG balance in Ireland was inflated by 0.5 per cent of GDP per annum - a very significant sum given that the GG surplus averaged 1.3 per cent of GDP during this period.<sup>20</sup> Conversely, the estimates also suggest that the deficit (between 2008 and 2013) was overstated by 0.1 per cent of GDP per annum on account of the abnormally low levels of activity within the housing market.

## **5 Implications for Fiscal Policy?**

The overall fiscal framework within Europe is governed by the Stability and Growth Pact (SGP). In assessing the sustainability of public finances for member states, the SGP gives prominence to headline aggregate concepts such as the GG balance, the structural budget balance as well as the GG debt to GDP ratio. In the past few years, a range of initiatives have been adopted at a European level to strengthen the SGP with greater prominence given to the debt rule and to the evolution of government spending through the expenditure (benchmark) rule.<sup>21</sup> There have also been a series of measures introduced to strengthen fiscal surveillance. As part of this evolving

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<sup>20</sup>It is also important to bear in mind that these windfalls take no account of second round or multiplier effects nor do they account for possible windfalls from income tax.

<sup>21</sup>For a description on the fiscal framework within Europe, see European Commission (2013).

framework, several countries have set up independent fiscal councils or institutions to monitor compliance with these rules. For example, the Irish Fiscal Advisory Council, established in 2011, is mandated to assess compliance with the fiscal rules and to provide a view on the overall fiscal stance of government. While empirical evidence tends to support the idea that independent fiscal institutions improve fiscal discipline, the experience of the Irish public finances in the lead up to the financial crisis argues strongly for a more granular approach when assessing fiscal sustainability along with the existing measures underpinning the SGP.

The results presented here suggest that headline fiscal ratios in Ireland were significantly affected by disequilibrium in the housing market. These distortions were largest during the housing bubble period (2003-2007), at a time when the Irish economic and budgetary performance was lauded across the EU.<sup>22</sup> However, we argue that headline GG deficit (and debt) ratios did not adequately reflect the underlying weakness of the public finances.

If we take 2006 for example, Ireland had the second highest budget surplus in the Euro Area (5.8 percentage points of GDP above the critical 3 per cent EDP threshold) and the second lowest debt ratio (some 36 percentage points of GDP below the 60 per cent Maastricht ceiling). To put these figures in context, in Figure 12 the GG balance for a selection of European countries is shown. Estimates at the time would have pointed to a tight and fairly conservative fiscal policy.<sup>23</sup> On the basis of these criteria and given the approaches typically adopted to fiscal surveillance by fiscal councils, it is questionable whether the structural weaknesses in the taxation system would have been adequately identified. Rather, it is likely that most of the debate would have centred around estimates of potential growth and the consequent implications for the structural balance.

## 6 Conclusions

This analysis in this paper confirms the very significant role played by the housing market in influencing both the tax-take and the overall fiscal position in Ireland. Over an extended time period covering three decades, there have been a number of instances where excesses in the

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<sup>22</sup>While there were warnings issued by international institutions, none were remotely close to anticipating the collapse in the economy that followed from 2008. See Casey (2014) for further details.

<sup>23</sup>For example, according to Irish Department of Finance estimates at the time, the cyclically adjusted budget surplus tightened significantly over this period.



housing market have spilled over into fiscal aggregates, notably in the housing bubble period between 2003 and 2008. However, with the on-going adjustments in the housing market, it would appear that prices and volumes have overcorrected in recent years. This means that housing related taxes have been artificially low and have acted as a drag on key fiscal ratios. Such a finding indicates that housing related taxes can be expected to recover quite significantly over the medium-term. This, in turn, has implications for the formulation of budgetary policy and, in particular, the manner in which the structural budget balance is estimated. The results here (all else equal) would indicate that current estimates of the structural deficit may be overstated (due to the failure to adequately capture housing market developments). Much greater emphasis should be given to modelling key taxation aggregates in framing fiscal policy decisions.

The recent crisis has highlighted how domestic policy mistakes (both in terms of budgetary planning and financial market regulation) can greatly amplify economic shocks. Irish budgetary policy in the run up to the financial crisis of 2008/09 was clearly based on unsustainable levels of housing related tax receipts; government expenditure increased by 9.5 per cent per annum on average over the 2003-07 period despite effective full employment. Combined with a series of budgetary measures which lead to a consistent narrowing of the tax base, this left the public finances ill prepared for any (significant) downturn in the housing market.

Finally, understanding the link between tax aggregates and the economic activity associated with them is also important from a forecasting perspective. At several times in the past, tax forecasting errors in Ireland have been high partly relating to housing market developments. Incorporating likely future developments in the housing market should improve the accuracy of fiscal planning over the medium-term.

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## A Is Income Endogenous in a Model of Irish House Prices?

Given the extent to which overall activity in the Irish economy was impacted by developments in the housing market, one issue which may arise in standard house price models is the potential endogeneity of the income variable typically specified as an independent regressor.

We address this issue by instrumenting for the  $(\frac{y}{pop})$  variable in (7). As our instruments we wish to use variables which are correlated with Irish economic activity but which are not correlated with the credit bubble which occurred in the Irish economy. The first variable we use, following Kelly and McQuinn (2014), is the UK unemployment rate. The traditional close relationship between the two markets has been noted in many studies of the Irish labour market, for example, the large scale model of the Irish economy, HERMES (see Bradley, FitzGerald, Hurley, O'Sullivan and Storey, (1993) for details), specifically assumes that wage rates in the Irish economy are a function of the differential in unemployment between both countries (see Bergin, Conefrey, FitzGerald and Kearney (2010), Curtis and FitzGerald (1994) and FitzGerald (1999) for more on this). It is most unlikely that there would be reverse causation between Irish house prices and UK unemployment. As a second instrument we use the volume of Irish exports as this variable is also unlikely to be impacted by housing market developments and, thus, unlikely to be correlated with the error term in the house price regression.

Results for the instrumental variables (IV) estimation, along with those of the OLS are presented in Table A1 along with some standard IV diagnostic tests - note in the interests of brevity we just include the results for the  $(\frac{y}{pop})$  variable. The coefficient on the instrumented income variable is now at 2.44 compared with 2.48 for OLS. For the diagnostic tests, we cannot reject the null hypothesis that the income variable is exogenous. This leads us to believe that our baseline house price model is not affected by endogeneity issues.

Table A1: Instrumental Variables Regression: 1983:1 - 2014:4

Variable	OLS Estimate	IV Estimate
constant	-24.34 (0.00)	-23.76 (0.00)
$\ln\left(\frac{y_t}{pop_t}\right)$	2.48 (0.00)	2.44 (0.00)
<i>H<sub>0</sub> : Variable is exogenous</i>		
F-Test		0.027 (0.869)

**Note:** P-values are in parentheses.

Table 2: Property Dependent Taxes in Ireland: Average Annual Yield and Share of Tax Revenue

	1984-2002 Convergence		2003-2007 Housing Bubble		2008-2013 Contraction and Recovery	
	€ billion	% of Tax	€ billion	% of Tax	€ billion	% of Tax
Stamp Duty	0.6	3.2	2.7	6.6	1.2	3.5
CGT	0.3	1.5	2.2	5.4	0.4	1.2
VAT	4.2	25.9	12.1	30.3	10.2	29.6
Total Taxes	15.8		39.9		34.7	

**Source:** Department of Finance Exchequer Returns.

Table 3: Summary of Data: 1984:1 - 2014:2

Variable	Pneumonic	Mean	Minimum	Maximum	Units
Stamp	<i>S</i>	66.3	8.0	356.1	€ millions
Vat	<i>V</i>	88.2	20.8	223.0	€ millions
Capital Gains Tax (CGT)	<i>C</i>	28.3	1.6	186.3	€ millions
Housing Supply	<i>H</i>	9,088	1,691	26,949	units
House Prices	<i>P</i>	56.8	16.2	130.5	Index
Income	<i>Y</i>	12,473	2,262	25,737	€
Interest Rates	<i>R</i>	4.2	-1.72	10.9	%

**Note:** All tax items are on a quarterly basis. Income refers to household disposable income and is on a quarterly basis. The house price index is = 100 in 2005.

Table 4: Unit Root and Cointegration Results

Test	$s_t$	$v_t$	$c_t$	$p_t$	$h_t$	5%
<u>Unit Root</u>						
ADF t-test	-2.3	-1.1	-1.8	-1.6	-1.9	2.9
ADF <sup>GLS</sup>	-20.2	-1.3	-5.5	-3.4	-11.5	14.0
Phillips-Perron	-1.4	-1.2	-1.6	-1.4	-0.8	-2.8
<u>Cointegration</u>						
ADF t-test	-3.0	-1.7	-7.1			
ADF <sup>GLS</sup>	-20.1	-9.2	-69.9			
Phillips-Perron	-5.6	-5.4	-7.1			

**Note:**  $s_t$  is the log of stamp duty levels,  $v_t$  is the log of vat receipts,  $p_t$  is the log of house prices and  $h_t$  is the log of housing supply. The sample period is quarterly and runs from 1984:1-2014:2.

Table 5: Long-Run Estimates of CGT, Stamp and VAT Models

<i>Dependent Variable <math>c_t</math></i>	Estimator		
	OLS	DOLS	ARDL
$p_t$	1.63 (0.05)	1.65 (0.09)	1.45 (0.11)
$h_t$	0.37 (0.05)	0.37 (0.11)	0.56 (0.10)
<i>Dependent Variable <math>s_t</math></i>	OLS	DOLS	ARDL
$p_t$	0.61 (0.05)	0.64 (0.13)	0.55 (0.13)
$h_t$	1.04 (0.05)	0.96 (0.15)	0.83 (0.15)
<i>Dependent Variable <math>v_t</math></i>	OLS	DOLS	ARDL
$p_t$	1.12 (0.02)	1.10 (0.08)	1.14 (0.14)
$h_t$	-0.17 (0.02)	-0.12 (0.09)	-0.10 (0.14)

**Note:** Standard errors are in parenthesis, sample period is quarterly and runs from 1984:1 - 2014:2.



Table 6: Short-Run Estimates of CGT, Stamp and VAT Models

<i>Dependent Variable</i>	$\Delta c_t$	$\Delta s_t$	$\Delta v_t$
$ECT_{t-1}$	-0.54 (0.09)	-0.31 (0.07)	-0.15 (0.05)
$\Delta c_{t-4}$	-0.21 (0.09)		
$\Delta p_t$	2.57 (0.83)		
$\Delta p_{t-1}$		1.92 (0.57)	
$\Delta h_{t-1}$			0.20 (0.04)
$\Delta h_{t-3}$		0.37 (0.12)	
$\Delta h_{t-4}$		0.39 (0.13)	
$\overline{R^2}$	0.32	0.22	0.24

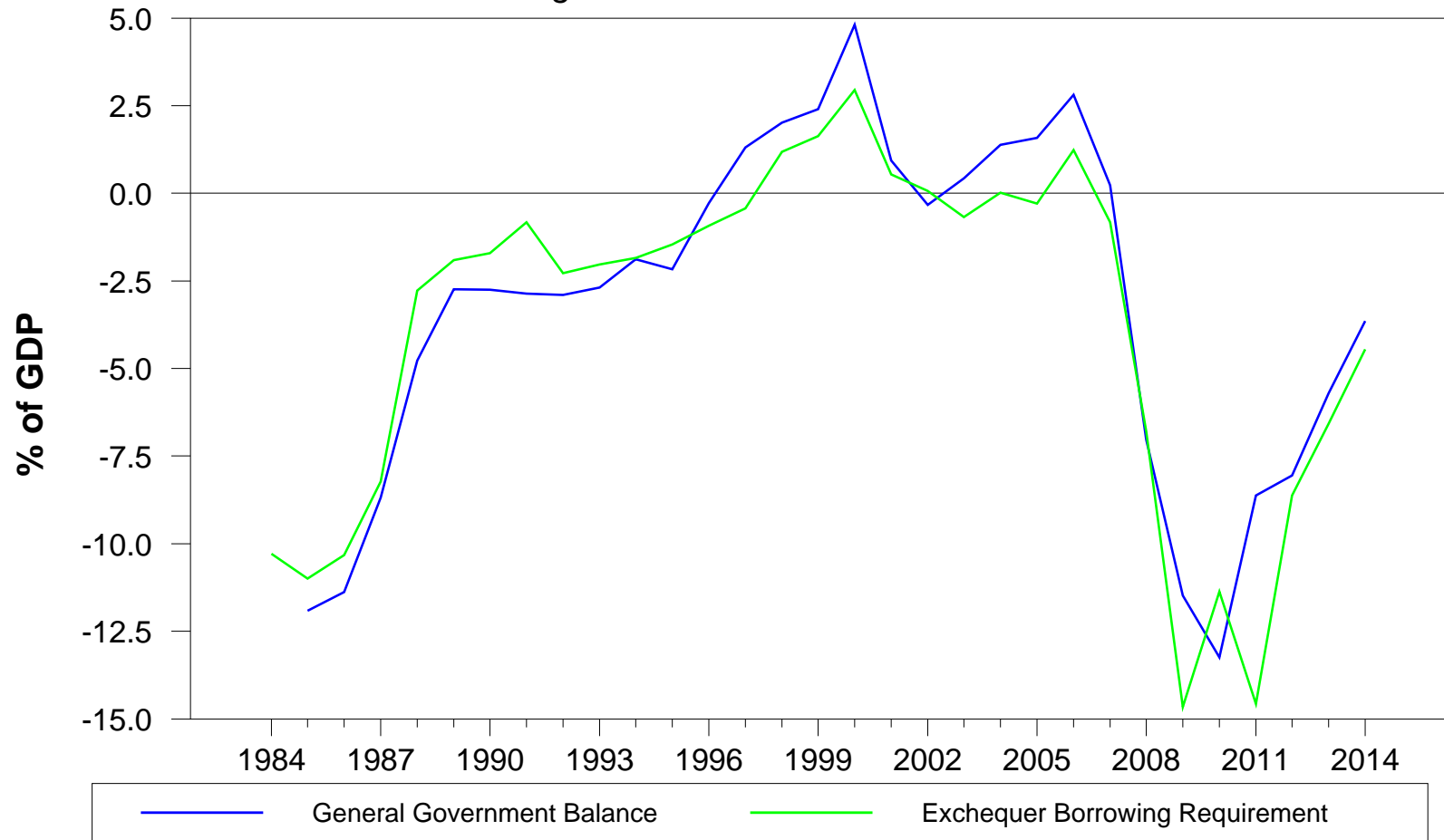
**Note:** ECT = error correction term and standard errors are in parenthesis. Sample period is quarterly and runs from 1984:1 - 2014:2.

Table 7: Average Quarterly Actual and Windfall Levels €(m)

Period	CGT			Stamp Duty			VAT		
	Actual	Windfall	%	Actual	Windfall	%	Actual	Windfall	%
2006 - 2008	114.1	57.1	50	234.5	126.6	54	206.8	62.9	30
2010 - 2013	17.6	-11.2	62	16.5	-20.5	124	137.4	-13.8	10

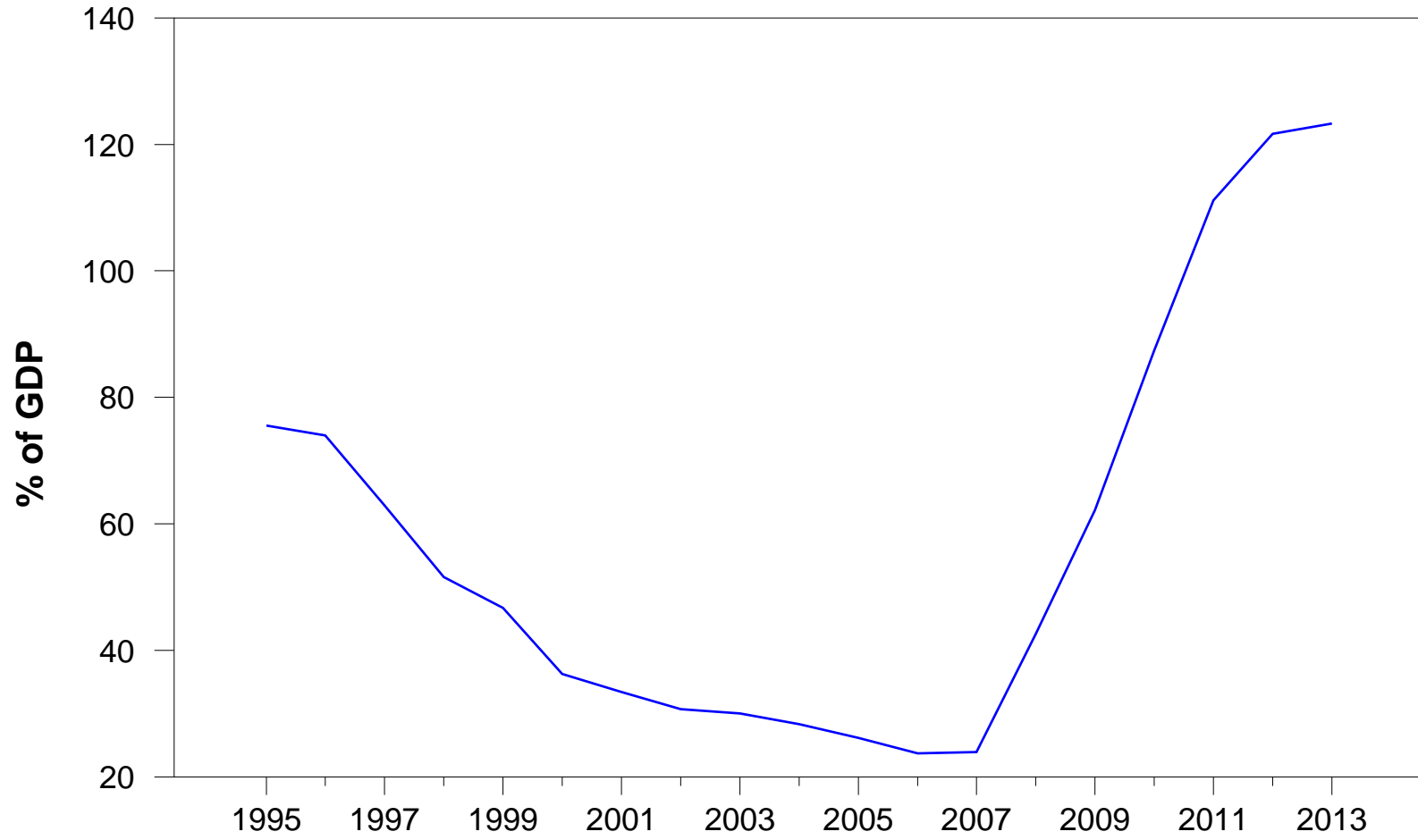
# Figure 1

*Budget Balance Ratios: 1984-2014*



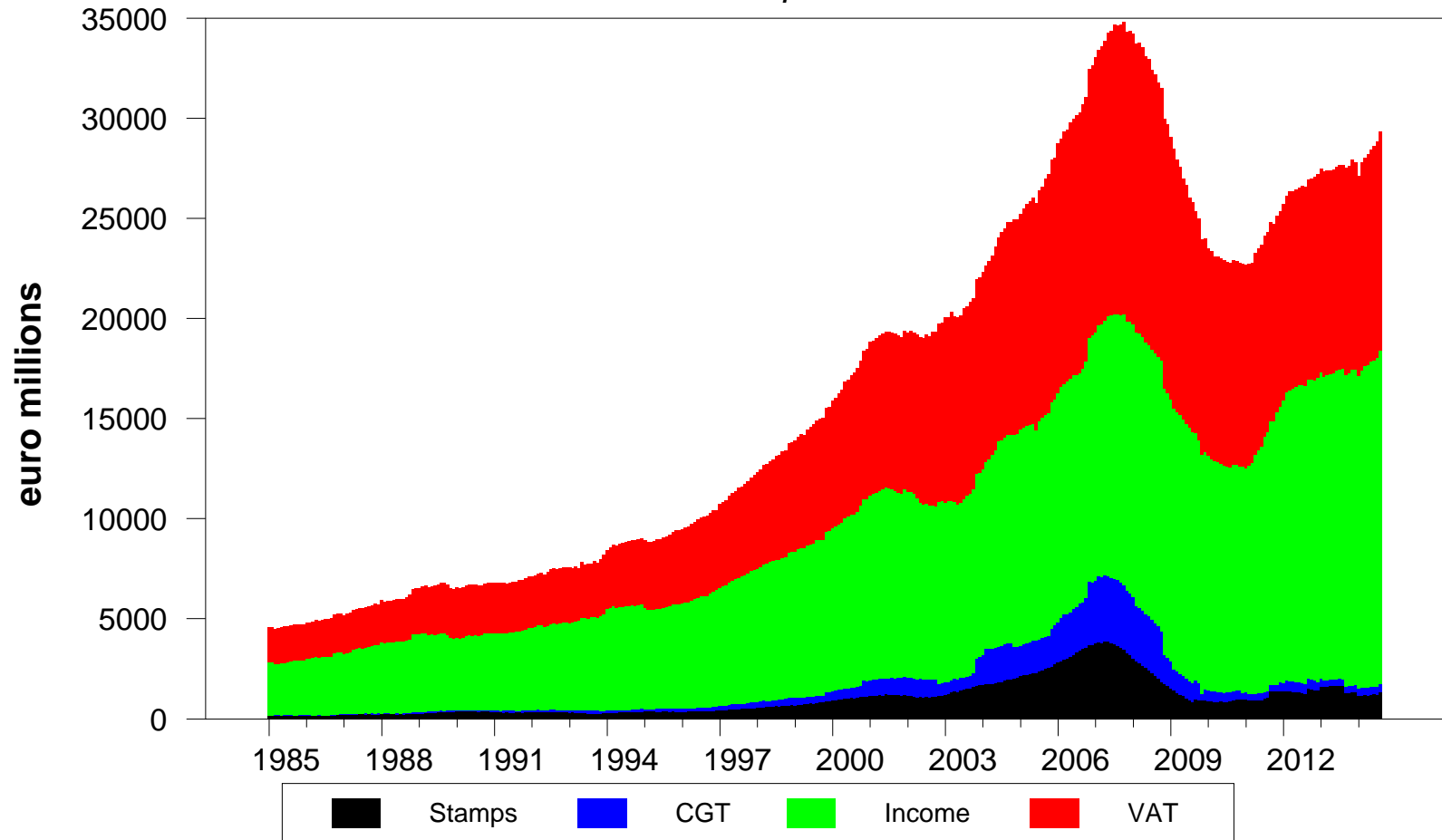
## Figure 2

*General Government Debt: 1995-2013*



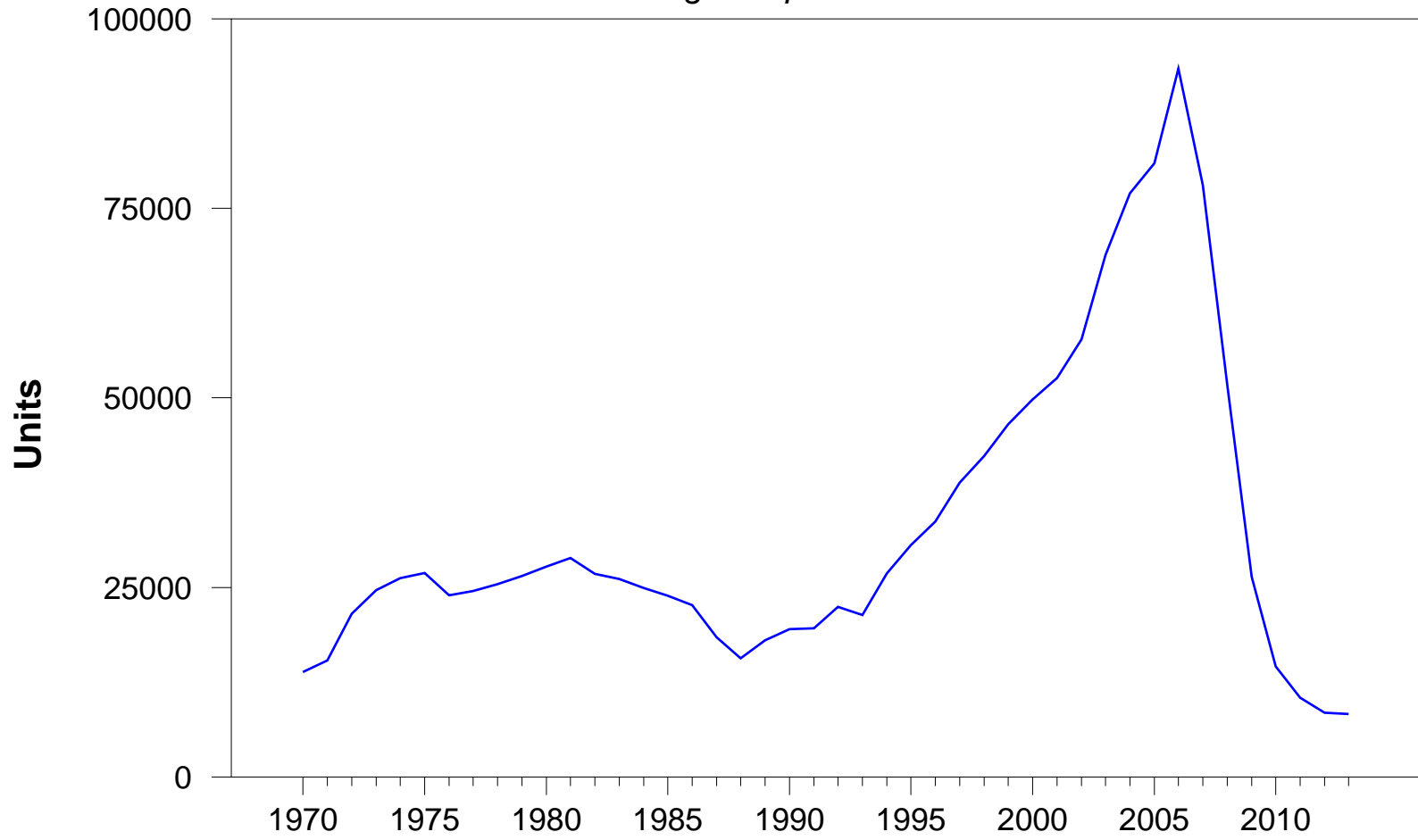
### Figure 3

*Annualised Select Exchequer Taxes: 1985-2014*



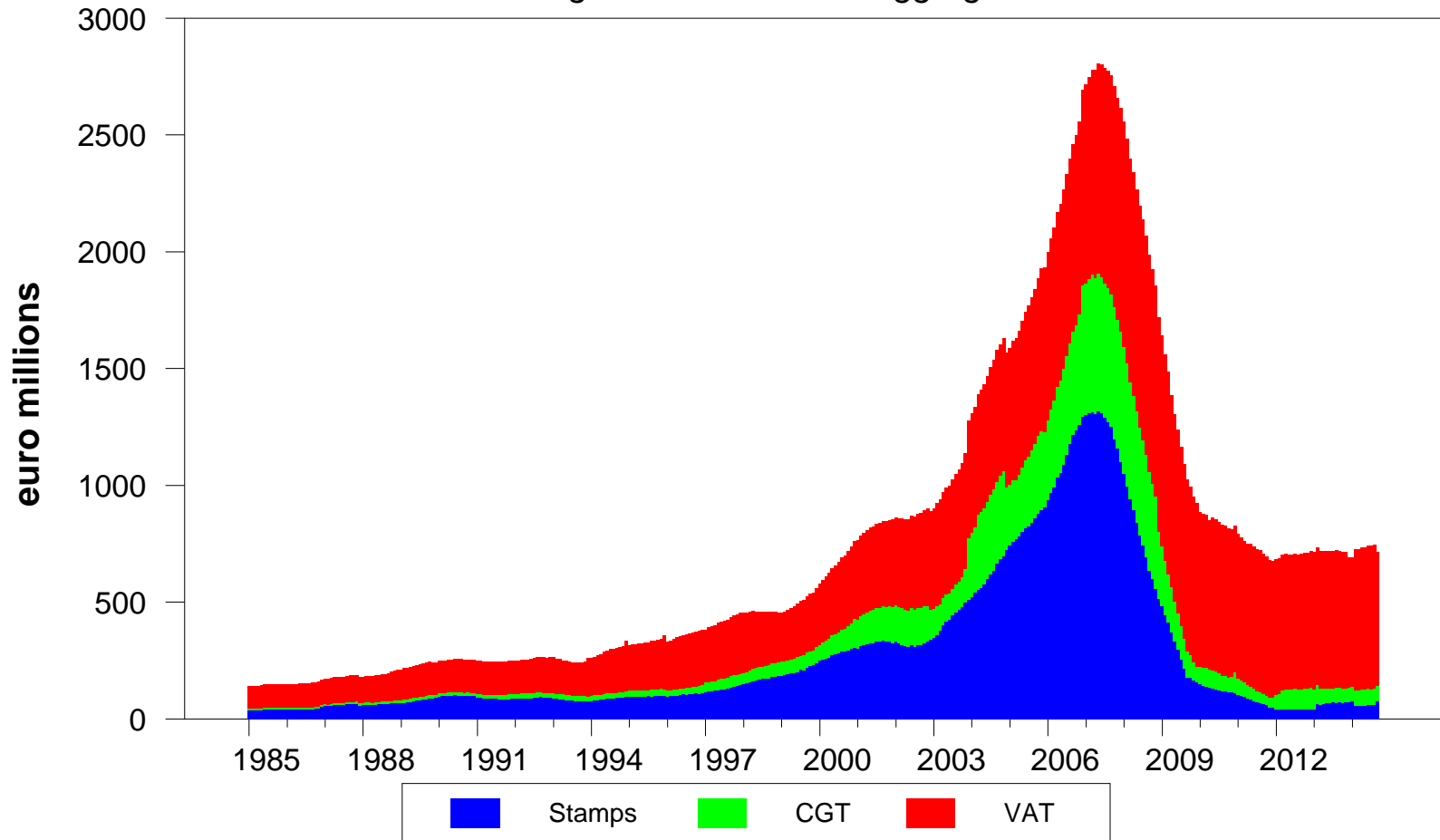
# Figure 4

*Number of Housing Completions: 1970-2013*



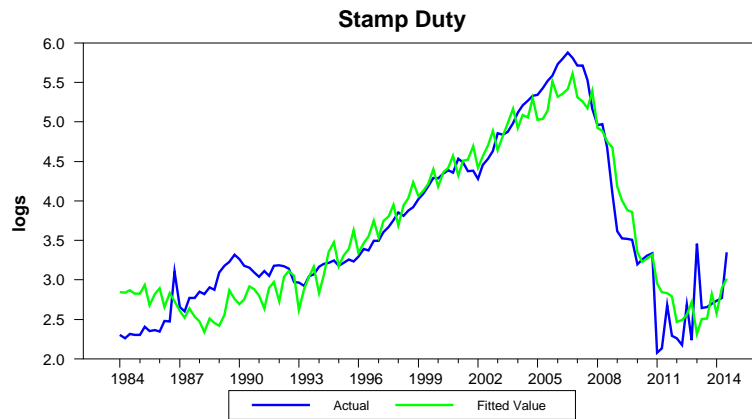
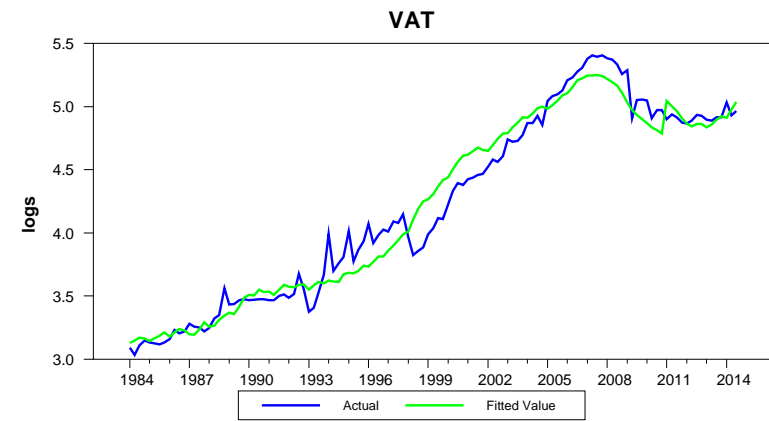
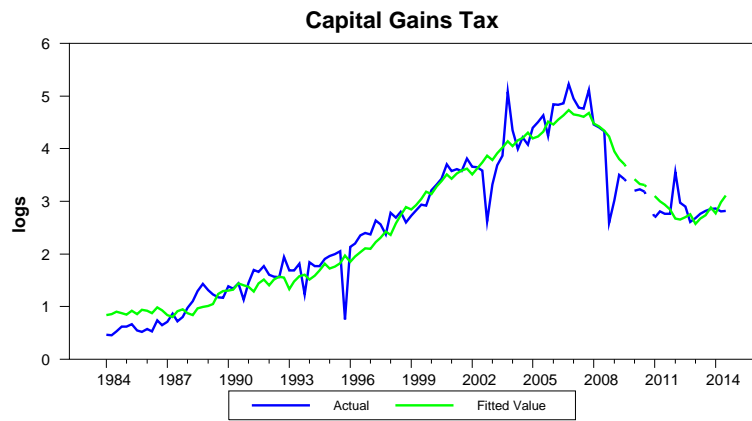
# Figure 5

## *Annualised Housing Related Taxation Aggregates: 1985-2014*



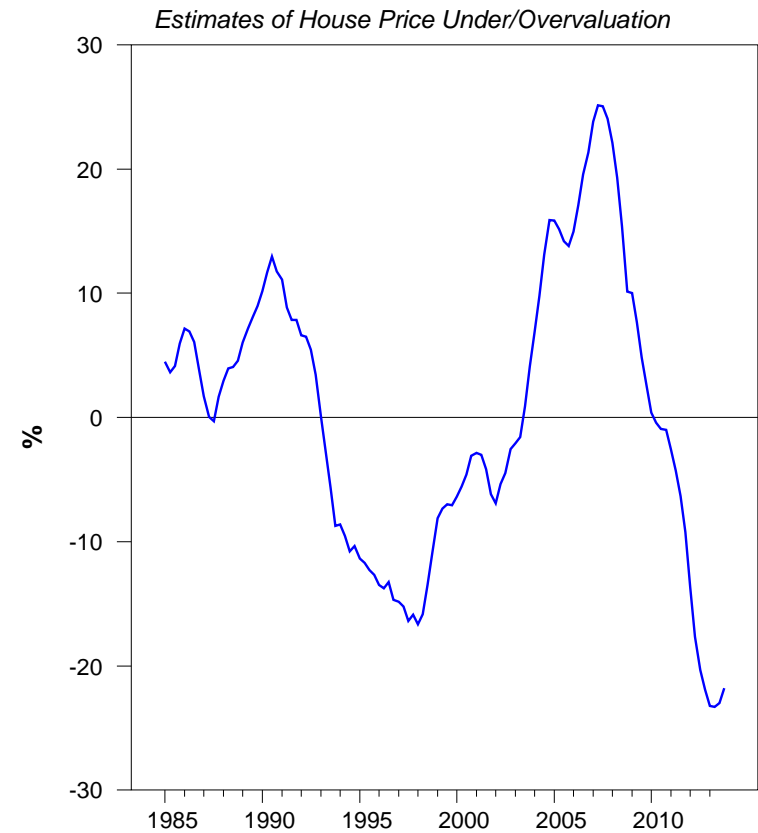
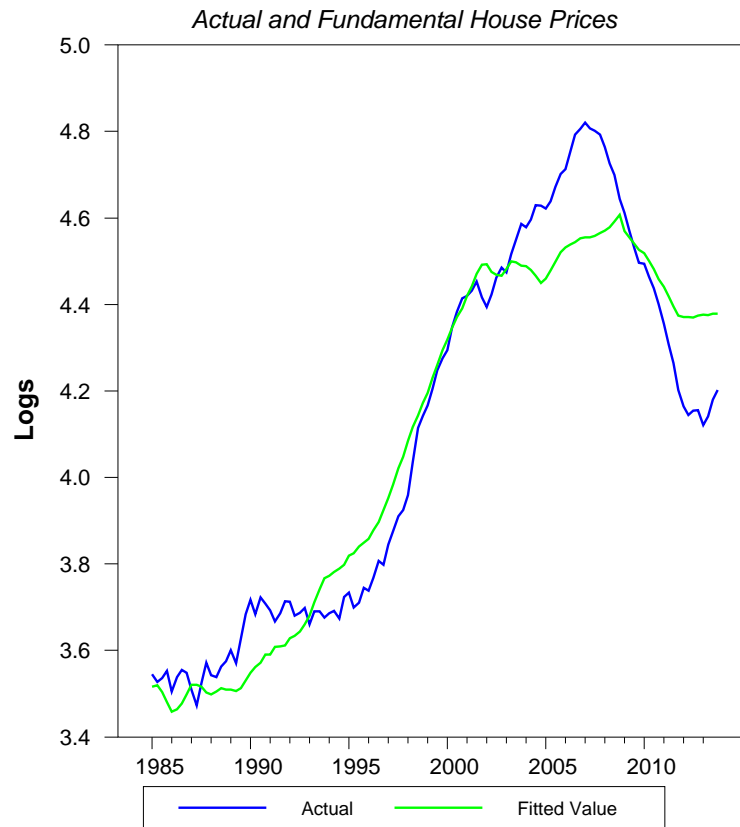
# Figure 6

*Tax Aggregates Actual and Fitted Values: 1984 - 2014*



# Figure 7

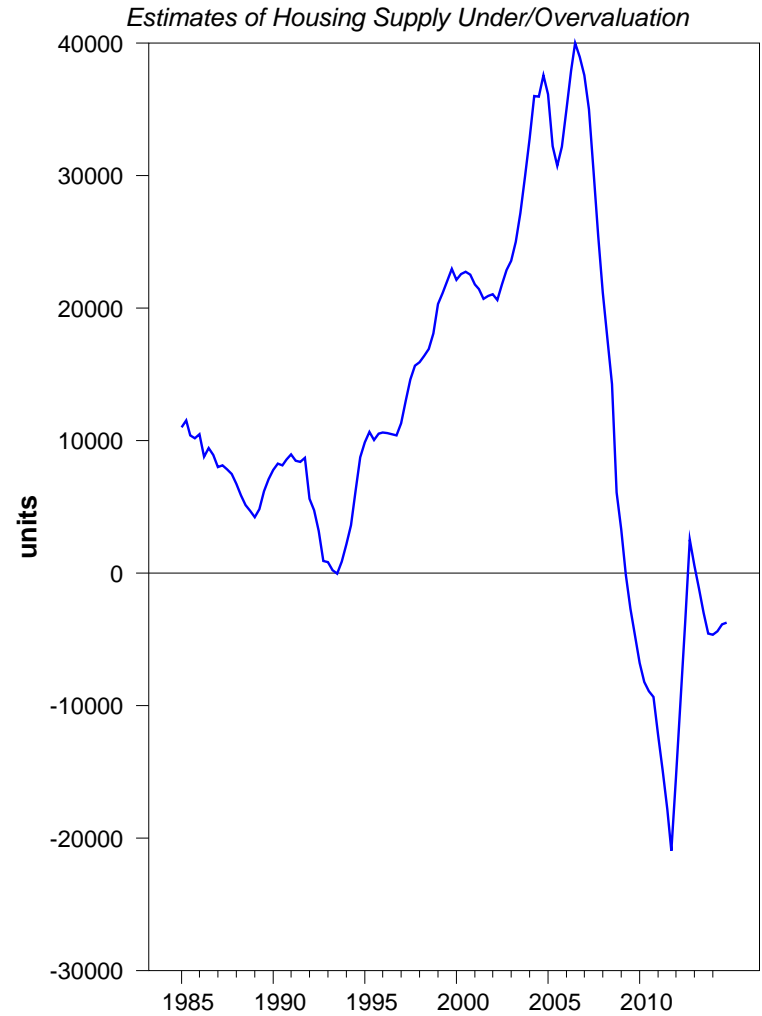
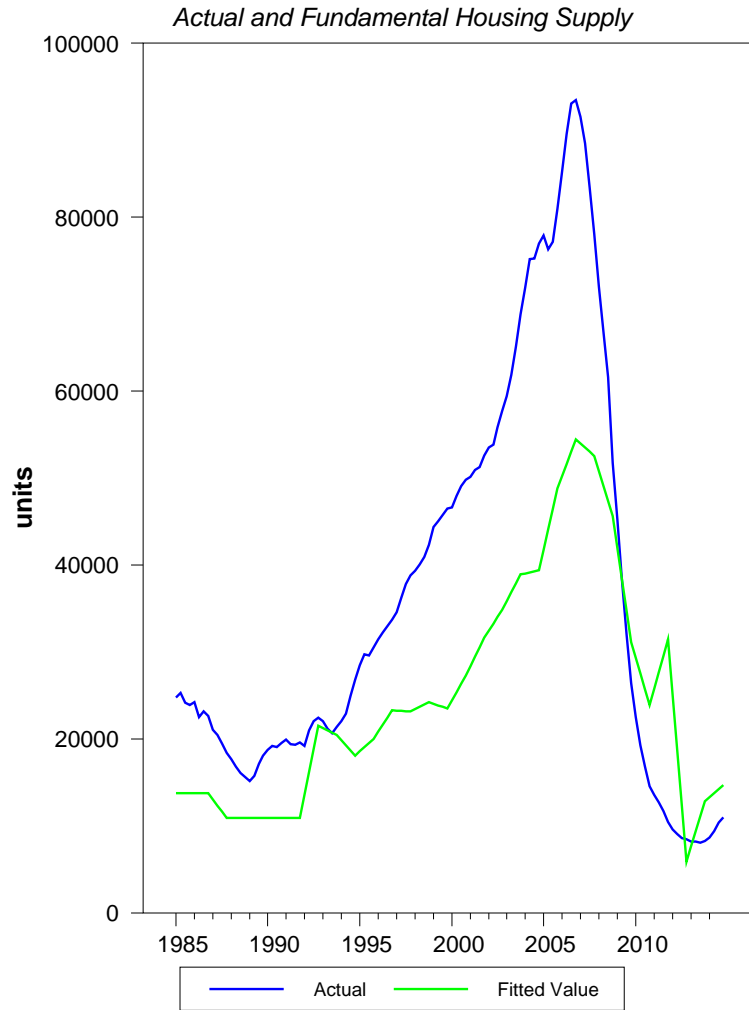
Results of House Price Model: 1985:1 - 2013:4





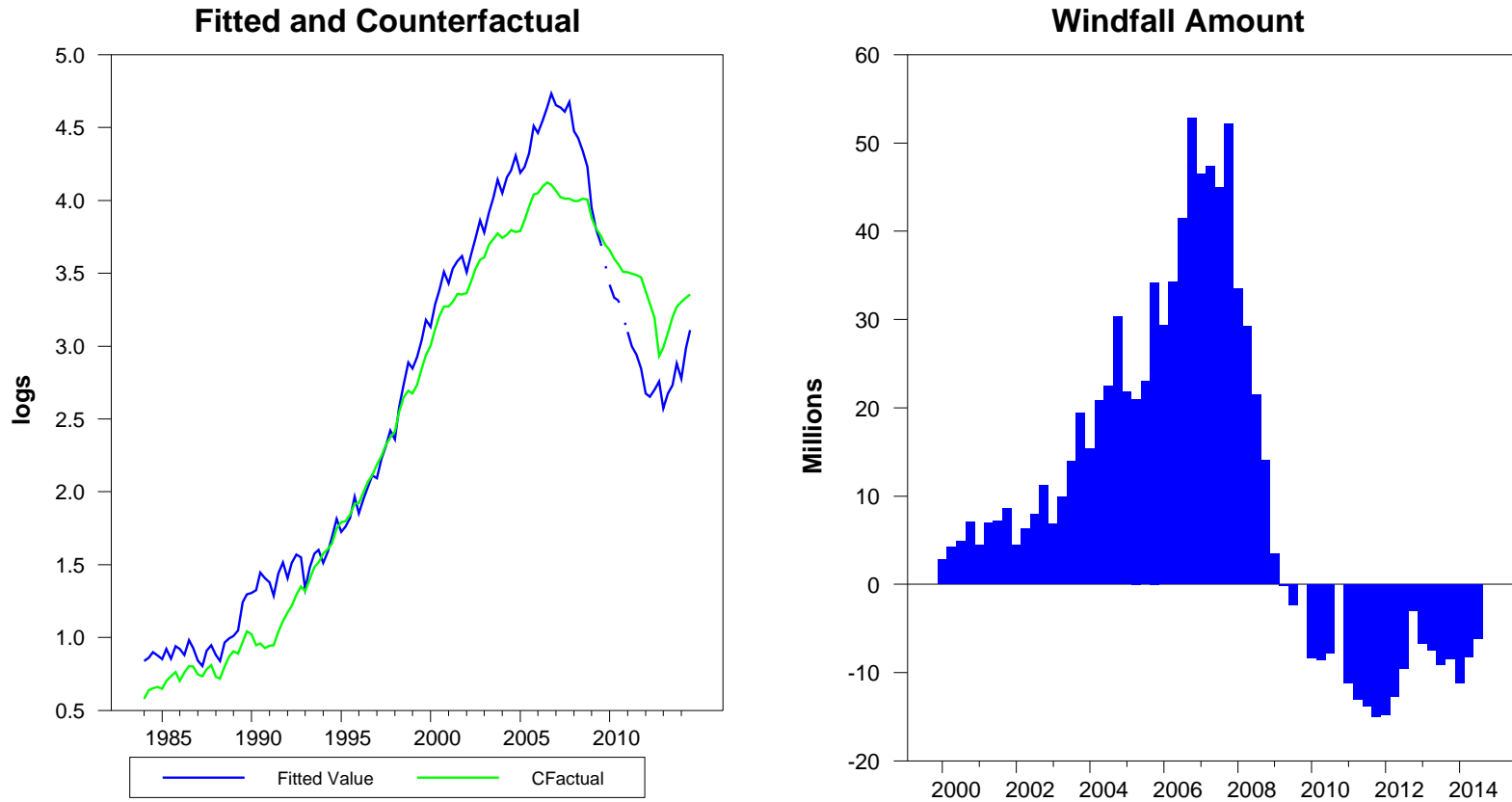
# Figure 8

*Estimates of Actual and Fundamental Housing Supply: 1985:1 - 2014:4*



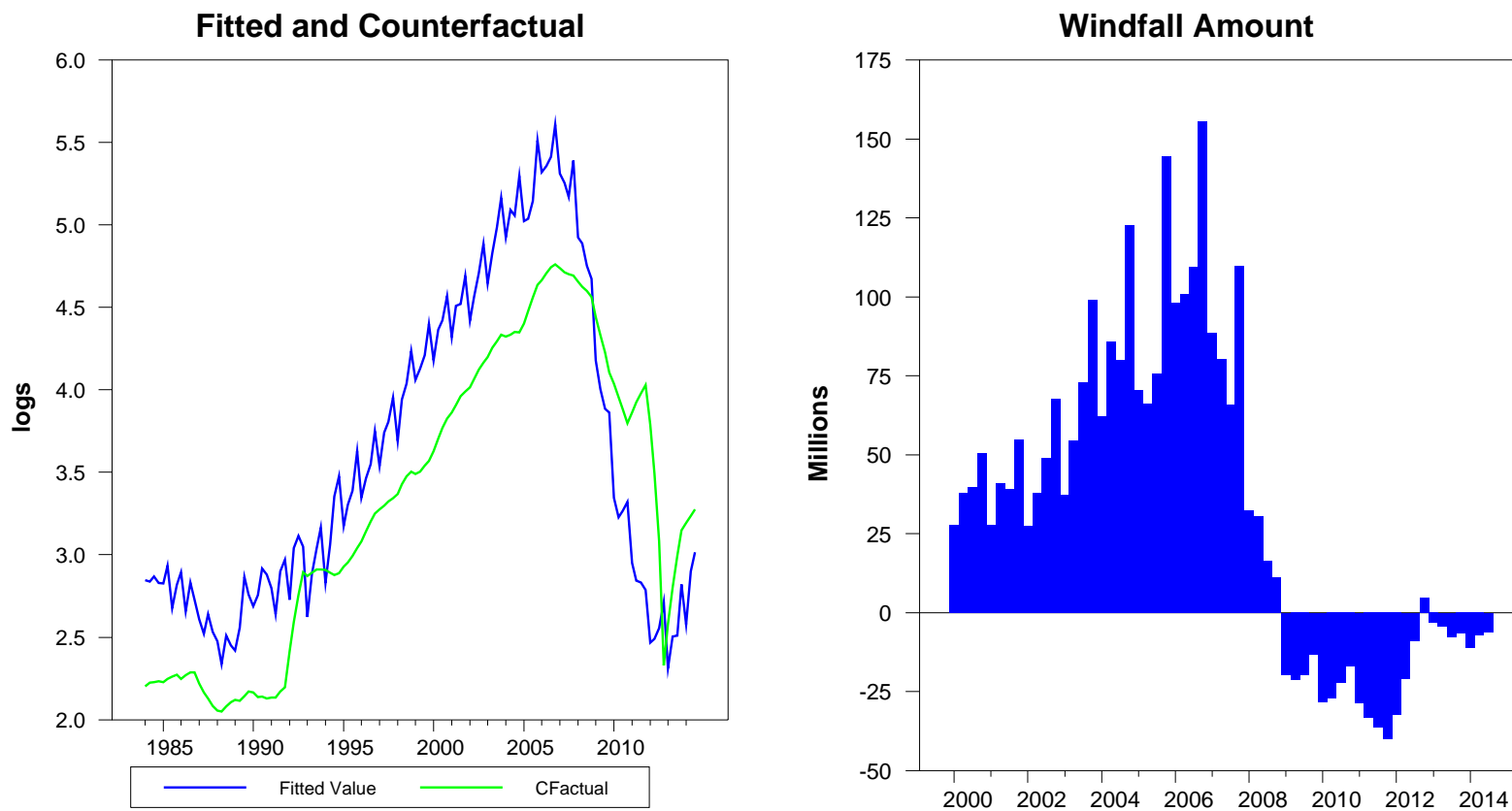
# Figure 9

## Windfall Estimates for Capital Gains Tax



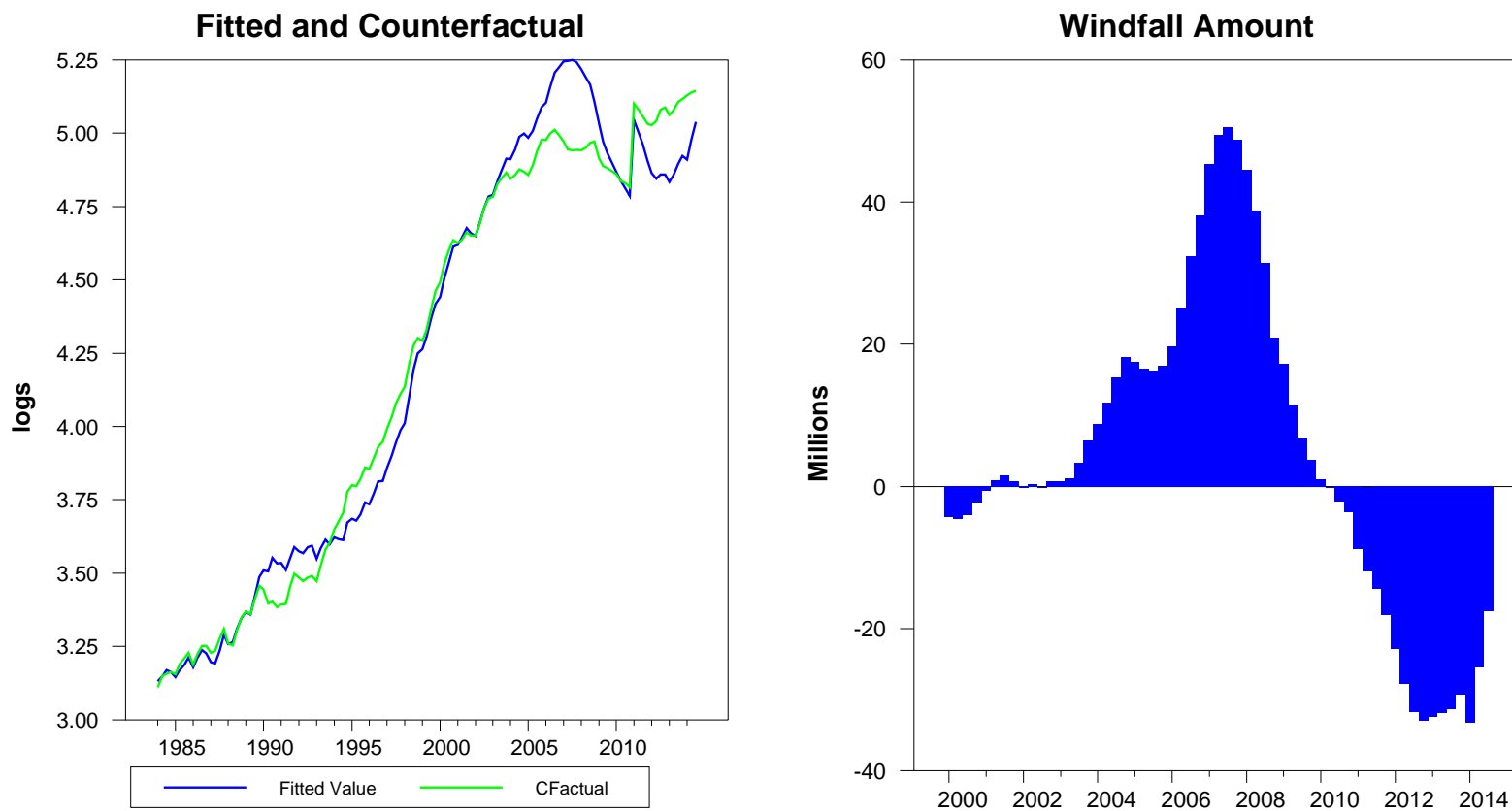
# Figure 10

## Windfall Estimates for Stamp Duty



# Figure 11

## Windfall Estimates for VAT



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