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Taming Global Finance in an Age of Capital? Wage-Setting Institutions' Mitigating Effects on Housing Bubbles

Alison Johnston and Aidan Regan

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Alison Johnston* and Aidan Regan**

Abstract

Analyses in international political economy (IPE) identify interest rate convergence, magnified in the process of European monetary integration, and financial market liberalization as causal factors behind the rise of house prices. Despite these common credit supply shocks, developed economies experienced heterogeneous trends in housing inflation throughout the 1990s and 2000s. Turning towards demand determinants of housing prices, we focus on whether wage-setting institutions blunt financial liberalization's impact on housing inflation via their restraining effect on incomes. Employing both a panel regression analysis and a structured comparison of housing developments in Ireland and the Netherlands, we uncover two findings. First, income growth is a more important predictor of housing bubbles across OECD economies than financial variables (although income's impact on house prices is severely mitigated for the United States). Second, countries with coordinated labor market institutions that grant political coalitions in the export sector veto powers over non-tradable sector interests, realize more restrained income growth and, in turn, are less prone to housing bubbles.

Keywords: housing prices, wage setting institutions, financial liberalization, Ireland, the Netherlands

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Table of Contents

Taming Global Finance in an Age of Capital? Wage-Setting Institutions' Mitigating Effects on Housing Bubbles

Introduction

The 2006 United States (US) subprime mortgage crisis and subsequent 2008 global financial crisis demonstrated the devastating effects of housing and asset price bubbles on national economies. In addition to their destabilizing effects on the political economy at large, implosions of housing bubbles also have important equity implications. Sudden declines in housing value can display regressive effects if disproportionate shares of poor households have a substantial proportion of their wealth stored in (subprime based) mortgages (Mian and Sufi, 2014). Likewise, Schwartz (2009) and Ansell (2014) have shown that the rise and fall of house prices has political effects on individual policy preferences toward the welfare state, redistribution, and government policymaking.

Within the comparative and international political economy (IPE) literature, interest rate convergence, especially in the run up to the creation of European Monetary Union (EMU), and the mortgage-backed securitization associated with global financial liberalization, are generally cited as key instigators of housing bubbles within developed economies (Mosley & Singer 2009; Schwartz 2009; Deeg and O'Sullivan 2009; Kindleberger and Aliber, 2011; Rajan 2011; Helleiner 2011). These two developments reduced the costs of

borrowing and increased the volume of debt instruments, introducing inflationary pressures in housing markets.

Global financial liberalization and general reductions in nominal interest rates have important effects on households' demand for borrowing. However, accounts of these general trends, which tend to rely heavily on the US case[1], fall short in explaining the wide *variation* in housing inflation within the OECD. Financial liberalization and reductions in nominal interest rates impacted all advanced political economies since the end of the 1970s. Despite this, housing bubbles emerged with noticeable irregularity, particularly in Europe. Some countries (Ireland, Spain, and the UK) witnessed considerable increases in housing prices during the 1990s and the 2000s, while others (Germany and Austria) witnessed average declines in nominal and/or real housing prices (OECD, 2012a; Bank of International Settlements, 2014).

In this paper, we argue that a *demand-side* comparative political economy approach can better account for the rise of housing bubbles than *supply-side* international political economy (IPE) approaches. We provide a sectoral class-based institutional argument behind the heterogeneous rise of housing bubbles within the OECD since the 1980s: countries that possessed labor market institutions that allotted the exposed sector, directly or indirectly via the state, agenda setting or veto powers in national wage-setting (i.e. export-led political coalitions) rather than the sheltered sector (i.e. domestic-led political coalitions), realized more moderated income growth, which in turn mitigated households' demand for mortgages and national housing price growth.

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[1] It is important to note that our dependent variable is housing prices not household debt. The USA had a subprime mortgage debt crisis that was associated with rising income inequality and financial products of securitization. Aggregate house price increases, however, were *not* that different from the OECD average.

Using an ordinary least squares (OLS) and instrumental variable (IV) panel analysis of 17 OECD countries between 1980 and 2007, and a structured comparison of Ireland and the Netherlands, we uncover two findings. First, (lagged) real income growth exhibits a much larger effect on housing inflation than (lagged) real interest rate reductions, while other domestic credit variables (expansions in domestic credit and capital account openness) as well as domestic *political* factors (government partisanship and central bank independence) display no significant association with housing prices. This income effect is eliminated for the US when we introduce country-interaction effects but remains robust for other liberal economies, including the United Kingdom. Second, countries that possess labor market institutions that enhance the bargaining power and interests of the exposed sector vis-à-vis unions in non-tradable sectors[2] in national wage-setting, realized smaller increases in housing prices than countries where non-tradable sector unions exerted greater political influence on the bargaining process.

Our results suggest that not only may domestic labor market institutions that govern income growth continue to trump the influence of broader international financial trends in the determination of housing bubbles within countries, but also that these institutions (and their underlying sectoral-class based coalitions) may play an important role in mitigating the worst effects of international financial liberalization on macroeconomic outcomes, especially *outside* the US. Whilst we agree with Ansell (2014) that the contemporary macroeconomic importance of asset-markets, particularly housing, has so far been neglected in comparative study of social and economic policy preferences, we disagree that labor market institutions, and the underlying sectoral-class based interests that shape these, are unrelated to the political

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[2] In this paper, we use the terms exposed and tradable sectors, and sheltered and non-tradable sectors, interchangeably.

3

economy of home ownership when looking at a wider sample of developed economies.

The political economy of housing bubbles: Financial liberalization's destabilizing effects?

In the IPE literature on financial liberalization, many have identified a link between the loosening of international capital controls, mortgage securitization, the supply of (housing) credit, and the presence of asset bubbles (Rajan 2010; Helleiner 2011; Kindleberger 2008; Mosley & Singer 2009). Moreover, the harmonization of financial market rules among developed countries reduced regulatory uncertainty among foreign lenders, providing further incentives for lenders to increase credit supply (Jones, 2014). Access to steady international capital flows (funded by new "innovative" financial products) provide governments and households with greater capacity to borrow due to higher credit *volume*. Such access is not without its consequences. As credit becomes more available, increases in housing and asset prices can transform into prolonged bubbles, which inflate the "true" value of assets. Capital inflow "bonanzas", which are highly conducive towards a rapid increase in household debt, are therefore associated with higher likelihoods of systemic economic crisis during periods of "sudden stops" (Reinhart and Reinhart, 2008).

Within the OECD, the increase in capital mobility also aligned with reductions in nominal interest rates, which made credit *cheaper*, particularly in

Western Europe.[3]   In what now constitutes the nineteen economies of the Eurozone, the drive towards a single currency facilitated a radical shift towards a low inflation, capital-friendly regime. This began with the European Monetary System's (EMS) fixed Exchange Rate Mechanism (ERM), and was then extended in the 1990s, with the nominal Maastricht criteria for EMU membership. Under the EMS, several European countries committed themselves to fixed exchange rates, which prompted them to initiate difficult wage and price adjustments in order achieve exchange rate convergence (Johnston, 2012; Johnston and Regan, 2014). Such adjustments, at least among countries that made a credible commitment to the ERM (removing capital controls in the process) resulted in reduced exchange rate volatility, and subsequently *interest rate convergence* and nominal interest rate reductions.

With the introduction of a common currency, exchange rate risk between European member-states was *completely* eliminated and, due to the undervaluation of default risk prior to the 2008 financial crisis, the average maximum spread in nominal interest rates on long-term government debt between 2000 and 2008 was 0.8% for the EMU12 (EU Commission AMECO Database, 2014).   Greater availability of credit and the reduced cost of borrowing that came with European monetary integration established an environment highly conducive towards increased private and public borrowing, which, through cross-national capital flows, became intimately connected to the liberalization of mortgage backed securities originating in the US (Schwartz 2009).

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[3] Under the interest rate parity condition, foreign and domestic interest rates equalize in the presence of capital mobility only if the expected future exchange is roughly equivalent to the current exchange rate (and if default risks are similar). This did not materialize in Latin American and East Asia, where exchange rates were volatile, and default risk was heterogeneous, but it did materialize in developed economies due to the rise of inflation targeting central banks, and in the case of the Western European economies, the European Monetary System's fixed exchange rate regime.

In addition to these global financialization trends, recent CPE scholarship notes that differences in cross-national approaches to credit expansion further exacerbated some countries' exposure to asset/housing price bubbles. Duca et al (2010) and Fuller (2015) outline that countries with permissive credit regulatory frameworks were more exposed to debt accumulation and in turn, asset bubbles. This argument has been further expanded in the welfare-state literature. Schwartz (2012), Schelkle (2012) and Trumbell (2012), note that politicians' support for credit policies promoting home-ownership served as a substitute for the welfare state and caused some countries, particularly Anglo-Saxon economies, to be overexposed to the 2008 financial crisis.

Rethinking the supply-side bias of IPE and CPE accounts of housing bubbles

Despite the importance of international credit expansion, these trends *alone* fail to fully account for the *heterogeneity* in housing bubbles among OECD economies. Financial liberalization and reductions in nominal interest rates affected all advanced market economies in the 1980s and 1990s. The level of capital account openness, if proxied by Chinn and Ito's (2006) liberalization index, was identical for EMU's original (1999) entrants by 1993, with Spain fully liberalizing its capital markets by 1994 (Karcher and Steinberg, 2012).[4] Likewise, all countries (including Germany) witnessed reductions in nominal interest rates between 1990 and 2000. Despite these commonalities, housing price inflation since 1990 was remarkably heterogeneous. For some countries (Ireland and Spain) destabilizing housing bubbles arose. In other countries, house prices increased but did not *transform* into bubbles (Netherlands and

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[4] Canada, Japan, the UK, and the US removed capital controls at the start of the 1980s, while Australia did so by 1985, Denmark by 1988, and Sweden by 1993 (Karcher and Steinberg, 2012).

Denmark). Finally, in others (Germany, Austria, and Japan), nominal and real housing prices were relatively stagnant.

Of course, one could argue that the *timing* of financial liberalization was not so homogenous across OECD economies, which varied somewhat throughout the 1980s and 1990s. Countries that removed capital controls and committed themselves to monetary integration and hard currency regimes later witnessed more sudden reductions in nominal interest rates. Consequently, they may have been more prone to rapid asset price bubbles and irrational exuberance than countries that undertook these adjustment processes earlier. This argument, however, is not empirically validated when looking at the relationship between interest rate reductions and housing price growth.

Figure 1 presents simple bivariate comparisons of differences in nominal/real interest rates, and percentage increases in nominal/real housing prices between 1990 and 2007 for 17 OECD economies.[5] Reductions in nominal interest rates fail to correspond consistently with increases in nominal house prices. Spain, for example, witnessed a decline in nominal interest rates by over 10% between 1990 and 2007 and an increase in nominal housing prices by over 270%. On the other hand, Ireland and the Netherlands witnessed much smaller declines in their nominal interest rates (5.8% and 4.6%, respectively), but had more pronounced housing price increases (450% and 300%, respectively). As will be highlighted in the case studies, much of the Dutch housing bubble occurred in the 1990s, while Dutch housing prices flat-lined in the 2000s. Similar inconsistencies arise when looking at real data: though countries like Japan, Germany, Sweden and US had similar reductions

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[5] These include Austria, Belgium, Canada, Denmark, Finland, France, Germany, Great Britain, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, and the United States.

in real interest rates between 1990 and 2007, changes in housing prices were markedly different.

Figure 1: Changes in Housing Prices (as a percentage of 1990 values) and differences in interest rates, 1990-2007
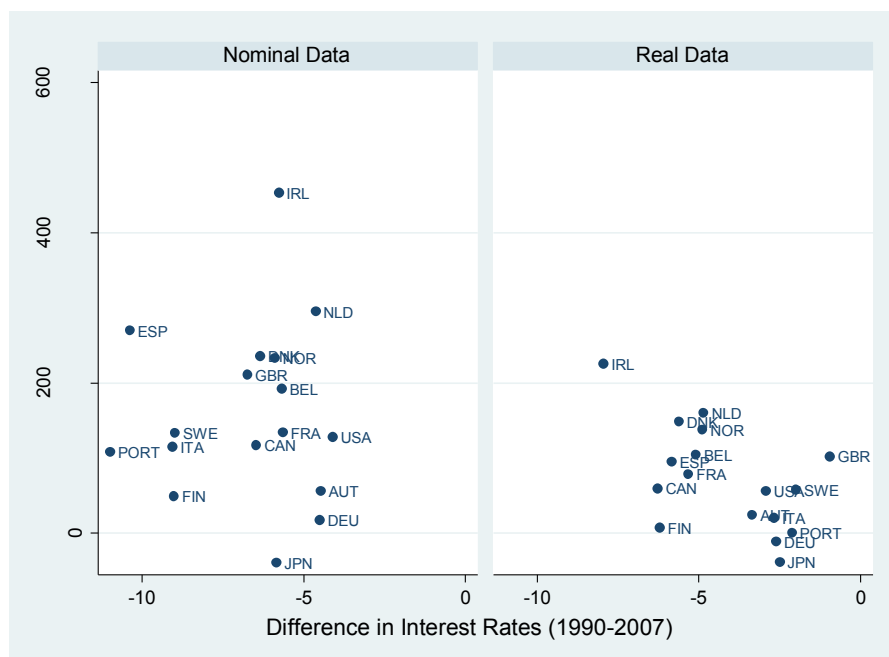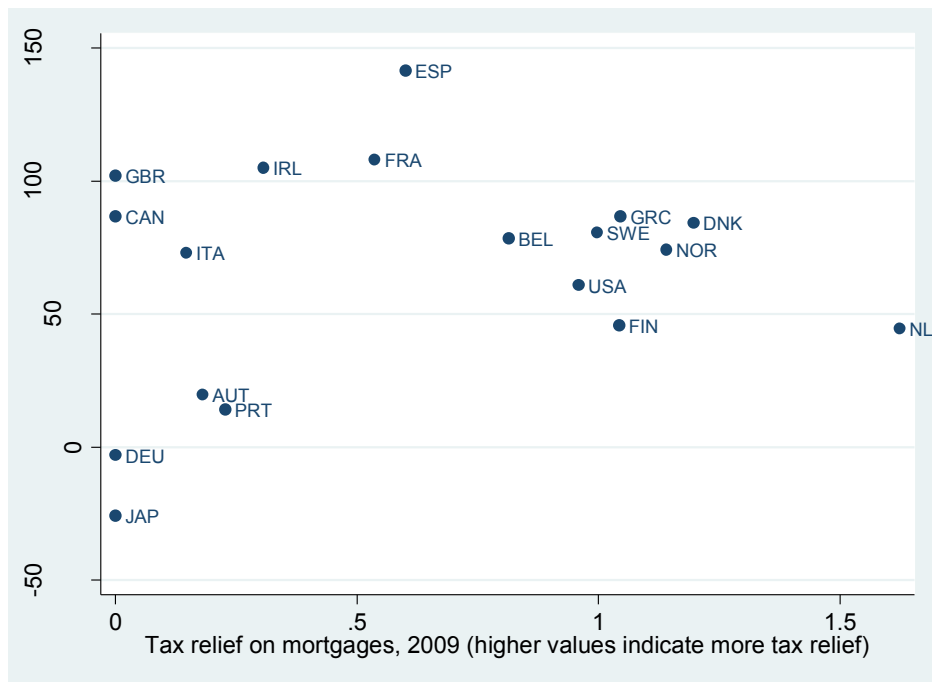

Housing price data from the OECD (2012a) except for Austria and Portugal whose housing price data stems from the Bank of International Settlements (2014); Nominal and real interest rate (using the GDP deflator) from the EU Commission's AMECO database (2014).

In regards to CPE accounts that focus on national regulations governing credit supply, changes in mortgage lending regulatory practices also fail to fully explain the heterogeneity in housing prices across the OECD. Figure 2 provides simple bivariate comparisons examining the relationship between 2009 tax relief on debt financing of homeownership (higher values indicate a greater subsidy wedge between the market interest rate and the interest rate households pay after the tax subsidy) and nominal housing price increases between 2000 and 2007.[6] Similar to the interest rate data, tax relief does a poor job at explaining housing bubbles before the 2008 financial crisis. Countries with more prominent increases in nominal housing prices (the UK and

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[6] The OECD (2011), lacked time series data on tax relief, so the 2009 level was compared with housing price changes between 2000 and 2007

Canada) had some of the lowest levels of tax relief for home ownership in the OECD, while countries with higher values of tax relief (Finland and the Netherlands) witnessed more repressed nominal housing growth between 2000 and 2007 (as we explain below, Dutch housing prices stagnated during the 2000's).

Figure 2: Changes in Nominal Housing Prices (2000-2007) and tax relief for homeownership (2009)

Housing price data from the OECD (2012a) except for Austria and Portugal whose housing price data stems from the Bank of International Settlements (2014); Tax relief data from the OECD (2011).

A similar picture emerges when examining the relationship between changes in maximum loan-to-value ratios and housing prices. Figure 3 provides a bivariate comparison examining the relationship between maximum loan-to-value ratio increases between 1990 and 2000 (the only years for which the OECD provides this data) and nominal housing price growth. OECD economies exhibit no discernible patterns in increases in maximum loan to value ratios and nominal housing prices. For countries in which limits on maximum loan-to-value ratios remained untouched between 1990 and 2000,

9

Taming Global Finance in an Age of Capital?

nominal housing price increases ranged from 2.5% to almost 100% during the same period. Pre-empting the causal mechanism in our case studies, Ireland and the Netherlands demonstrate that countries with vastly different policies towards changing maximum loan-to-value ratios witnessed similarly rapid house price increases between 1990 and 2000.

Figure 3: Changes in Nominal Housing Prices and maximum loan-to-value ratios (1990-2000)

Housing price data from the OECD (2012a) except for Austria and Portugal whose housing price data stems from the Bank of International Settlements (2014); Loan-to-value ratio data from the OECD (2011).

Finally, the welfare state literature on policy makers' preferences for credit expansion, also fails to sufficiently explain the heterogeneity of housing bubbles in the OECD. While we lack a precise measure of policy-makers' "preferences" for credit expansion (in our panel analysis below, government partisanship has no significant impact on housing prices), we possess data for the share of credit (as a percentage of GDP) provided to the private sector by financial institutions: domestic credit (taken from the World Bank, 2014), includes not only mortgage debt, but also non-mortgage based loans to

households and firms, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment. Countries who prioritize credit expansion should witness greater increases in their domestic credit supply to GDP ratios. However, though a slight positive relationship between private credit expansion and nominal housing prices exists between 1990 and 2007 (see Figure 4), this relationship is driven purely by Ireland[7]. Countries that witnessed markedly different expansions in credit (i.e. the USA compared to Canada or Sweden) witnessed similar increases in nominal housing prices between 1990 and 2007.

Figure 4: Changes in Nominal Housing Prices and Expansion in Domestic Credit (provided by financial institutions) to the private sector as a share of GDP (1990-2007)
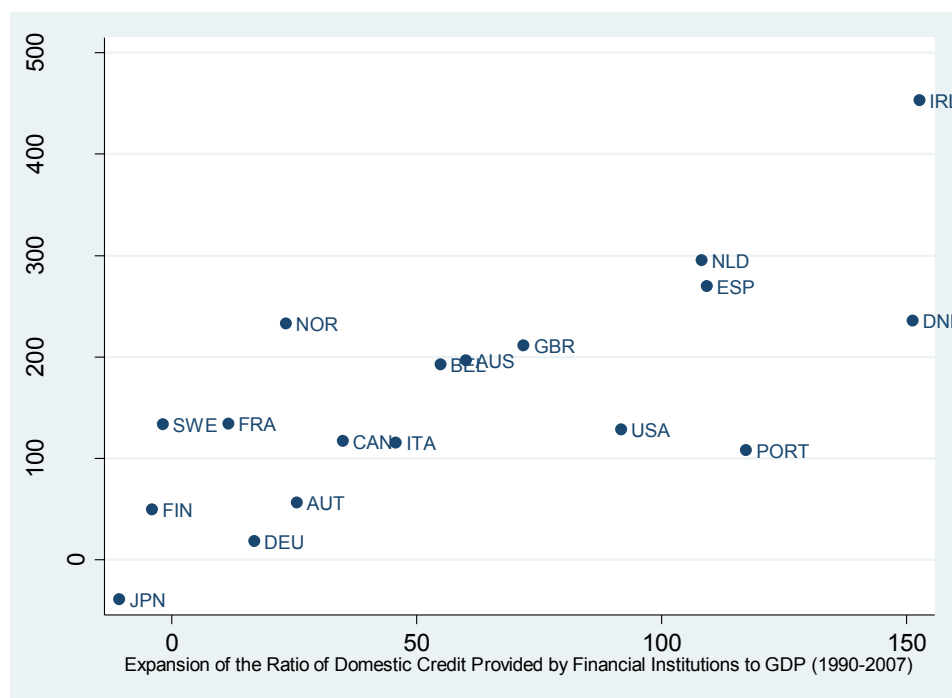

Housing price data from the OECD (2012a) except for Austria and Portugal whose housing price data stems from the Bank of International Settlements (2014); Private credit supply data from the World Bank (2014)

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[7] As we will outline in the case study, this credit expansion occurred from 2005 onward, which took place *after* a sharp increase in public sector wage growth and general income tax reductions.

Rethinking housing bubbles via a demand-centred perspective: The role of wage-setting institutions

One feature that links the comparative and international political economy literatures on housing markets is their *supply-side centrism*. While demand booms in the presence of cheap credit are acknowledged, there has not been a systematic explanation for why these booms fail to emerge everywhere, especially outside of the US case, which has dominated recent study on housing debt. Microeconomic literature has identified a strong causal link between (permanent or stable) household income and mortgage demand (Ortalo-Magné and Rady, 2006; Davidoff, 2006). Yet few look at more systematic institutional factors that might explain why income growth is more persistent in some countries but not in others, and the extent to which this fuels the pro-cyclical impact of a generalised low interest-rate credit shock.

Recent (liberal) welfare state research (Trumbull, 2012) suggests that income growth and credit expansion may be *substitutes* (i.e. credit-for-welfare). Mitigated income growth *requires* households to take on more debt to maintain a given level of spending; hence, low income growth corresponds with higher demand for credit, and ultimately housing prices (in the US, this was further exacerbated by the permissiveness and prominence of subprime mortgages). Though income stagnation overlapped with credit booms in the US (and the UK), this country, whose credit regulatory policies are heavily lax (see Fuller, 2015), may be a unique case, and does not adequately represent housing demand dynamics across other developed economies. It is equally possible that income (which is one of the most important determinants of whether a household can take out a mortgage) and credit serve as *complements* rather than substitutes, as in the USA. Higher incomes *enable* households to

take on more mortgage debt, as their loan-value to income ratio declines, placing upward pressures on housing prices.

We draw upon labor market research in comparative political economy to examine whether income growth amplifies mortgage-credit demand and housing prices in the OECD at large. We analyze the impact of domestic *institutions* that govern wage-setting on housing prices through their determination of income growth. Labor market institutions have been frequently linked to wage moderation (Soskice, 1990; Hall and Soskice, 2001; Iversen & Soskice 2010; Johnston and Regan, 2014), and in turn inflation. Classical political economy literature highlights that encompassing, centralized and/or coordinated collective bargaining at the national level reduces the collective action problem among unions to push for higher wage increases, leading to persistent wage moderation.

Given that labor market institutions impact inflation, we suggest that such political dynamics may also constrain housing bubbles through their impact on housing demand. Coordinated wage setting institutions may have bubble-mitigation effects for two reasons. First, repressed income growth that stems from these institutions reduce domestic demand for all goods, including debt instruments required for purchasing major durable goods (i.e. home mortgages). Second, since collective bargaining institutions *can be* relatively sticky (i.e. not subject to frequent change), they may influence households' future expectations of income growth. If wage coordination mechanisms consistently deliver slow income growth in the past, households may expect that these institutions will continue to deliver wage moderation in the future, and adjust their demand for mortgages accordingly.

Taming Global Finance in an Age of Capital?

Recent political economy literature outlines the importance of *sectoral dynamics* when examining the influence of labor market institutions on policy preferences (Rehm & Wren 2014). Others have examined how sectoral coalitions influence aggregate wages and prices (Brandl, 2012; Johnston et al, 2014). National demand is determined by income growth in two different types of sectors: tradable (export-oriented) and non-tradable (domestic–oriented). Wage-setters in the former have the incentive to restrain wage growth, because employers are less able to pass wage increases onto prices due to competitiveness constraints. If unions price wages too high, employers are more likely to respond with employment shedding rather than price mark-ups. Wage-setters in the non-tradable sector, however, do not possess similar incentives as employers have greater leeway to pass on wage increases to prices (in the public sector, such wage increases can be passed onto/funded by taxes or borrowing). The conflicting incentives of these different sectoral-class interests have important consequences for domestic inflation, yet the possible influence of these sectoral differences on *asset-prices* remains largely unexplored.

Despite the fact that differences in sectoral-class interests exist within all political economies, some countries possess domestic labor market institutions that better contain the influence of the non-tradable sector in shaping aggregate wage outcomes. These countries have coordinated wage-setting institutions that grant the export-sector, either directly or indirectly via state intervention, veto powers in the determination of national wages. Because export-based coalitions have the incentive to limit aggregate wage growth in sheltered sectors for competitiveness reasons, *coordinated collective bargaining institutions* that grant them the upper hand in wage negotiations make it easier for these interests to enforce their wage moderation preferences on the economy at large. Such institutions frequently underpin export-led

growth regimes but have generally been overlooked in IPE research on the macroeconomic roots of the international financial crisis.

Building on previous work on sectoral-class politics (Brandl, 2012; Johnston et al, 2014), we suggest that there are three coordinated wage-setting regimes that grant greater agenda setting and veto powers to the export sector, thereby enhancing their political bargaining power vis-à-vis sheltered sector unions. These include: *multi-employer* pattern bargaining regimes where exposed sector firms act as trend-setters (Germany and Austria); *state imposed* coordination regimes that grant the government unilateral power to deliver (public sector) pay outcomes in line with export-sector preferences (France and Belgium), and; state-led wage pacts where the social partners bargain in the state's *shadow of hierarchy*. These pacts grant the state the unilateral *capacity* to establish productivity-based wage ceilings (or, in times of crisis, wage freezes) *if* unions and employers fail to negotiate wage restraint (Finland and the Netherlands).

- In pattern bargaining regimes, sectoral-class interests in the export sector (the metalworking sector for Germany and Austria) establish wage-settlements first. These then serve as the upper limit for all subsequent sectoral wage agreements in the wider economy. The political strength of the export (manufacturing) sector in Germany and Austria stems from the prominence of this sectoral-class coalition in shaping their national export-led growth regime, which has been sustained in the face of globalization due to their value-added production niches (Hall and Soskice, 2001).

- State imposed coordination regimes allot the state a unilateral role in monitoring wage inflation in line with exposed-sector interests. In France, such coordination stems from the state's use of the collective agreements of large exporting firms, which then act as non-negotiable benchmarks for the public sector (Hancké, 2002). In Belgium, the state's imposing role occurs through legislative statutory acts, which grant the government the capacity to intervene and cap wage growth if labor costs exceeds that of the average of Belgium's three largest trading partners (France, Germany and the Netherlands).

- The state's role in monitoring wage developments in the interest of the export-sector also exists in countries with state-led wage pacts. These tripartite pacts grant the government the statutory means to control wage increases but are usually a *temporary* feature of collective bargaining. They do not result in *direct* unilateral state intervention, but rather *indirect* state action via its threats to intervene unilaterally if wage restraint is not delivered. In the Netherlands, such wage pacts are used reactively in response to sudden increases in inflation and their terms involve either national wage ceilings or wage freezes, which are subject to legislative decrees if they are not met.

Other wage-setting regimes *fail* to grant veto powers to the export sector, thereby weakening its agenda setting power vis-à-vis the non-tradable sector. These include: peak bargaining regimes where both exposed and sheltered sector unions/employers are united under a confederal umbrella (Italy, Spain and Portugal); uncoordinated market-oriented regimes where individual wage-setters bargain independently with employers (the US and UK), and; non-state-led wage pacts where wage pacts are concluded between union and

employer confederations but the state lacks the power to ensure collective compliance (Ireland).

- In peak bargaining regimes, union confederations are unable to unify sectoral conflicts among competing affiliates. If the public sector holds greater membership in these umbrella organizations than the export sector, peak bargaining can be more prone to inflation. Sheltered sector dominated peak bargaining regimes differ to exposed sector dominated peak bargaining regimes where the export sector continues to exert influence in the peak confederation, due to its higher membership representation.   In Denmark, for example, the manufacturing sector's dominance within the LO has been maintained by the formation of the CO-Metal export cartel since 1992.

- Uncoordinated market-oriented regimes are, politically, more sector-neutral. Individual firms set wage growth on par with productivity developments, which for the non-tradable sector is usually lower than the export sector. However, such regimes do not have the capacity to deliver the degree of national wage suppression that exist in *collective* bargaining regimes, as fragmentation inhibits employers' capacity to coordinate and moderate wage growth in *all* sheltered sectors. Additionally, these regimes have the capacity to be wage inflationary if *income inequality* leads to disproportionate wage increases at the upper end of the earnings distribution. In the US and UK, these above-productivity wage increases are common in high-skilled services such as finance and legal services.

- These coordination problems are also present in non-state-led wage pacts (Ireland prior to the crisis). These pacts are delivered by peak-level confederations and their conclusion and enforcement relies upon the collective compliance of affiliates. However, unlike state-led wage pacts, the state has little capacity to ensure that concluded wage levels stay within or below agreed limits. In Ireland, where the dynamic multinational sector is non-unionized and hence relatively absent in the Irish Congress of Trade Unions (ICTU), these regular wage pacts rest largely on the preferences of public sector unions (Culpepper and Regan, 2014).

Appendix A provides the complete list of these wage-setting regimes and countries' classifications within them between 1980 and 2007. Our theoretical model rests on examining how these six wage coordination institutions (and their underlying sectoral-class interests) influence housing prices via income growth. We hypothesize that wage-setting regimes that limit income growth in non-tradable sectors (pattern bargaining, state-imposed coordination and state-led wage pacts) are more prone towards moderated income growth. Such repressed income growth reduces the demand for mortgage credit, which in turn limits the demand for housing, mitigating the possibility that house price increases turn into housing *bubble*s. Wage setting regimes that fail to moderate wage growth in the sheltered sectors (peak level bargaining non-state-led wage pacts, and to a lesser extent uncoordinated regimes) are more prone towards inflationary income growth. Such growth increases the demand for mortgage credit, which increases the demand for housing, placing upward pressures on housing prices.

An institutional model of housing bubbles in the OECD: Empirical evidence

Variables and Estimator

We employ a panel analysis of 17 OECD[8] economies from 1980 to 2007 to test whether income is more impactful in explaining housing price growth than financial factors. Our baseline model stems from Aizenman and Jinjarak (2009), who examine the influence of current account balances on housing prices. The authors use a (one year) distributive lag model to examine determinants of real-estate valuations for 43 countries between 1990 and 2005. Aizenman and Jinjarak's model includes only lagged independent variables, rather than present value independent variables, because real-estate is a substantial investment for households, who must incur significant debt burdens to purchase these assets. Therefore, changes in housing purchases that result from changes in income and interest rates are likely subject to greater delays than for other goods and financial assets.

The authors' final model includes only one year lags of the independent variable, although they acknowledge that the effects of current account balances persist up to five years. Below, we also present results for a *two year* distributive lag model (all independent variables are two years removed from the present value of the dependent variable), and the results are largely similar, except for population growth which becomes significant. The impact of all our independent variables become insignificant within the *third year* lag

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[8] These countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States.

(results shown in an online appendix). Our baseline model can be summarized as follows:

$$HP_{i,t} = \beta_1 + \beta_2 y_{i,t-1} + \beta_3 pop_{i,t-1} + \beta_4 \sum X_{i,t-1} + \beta_5 \sum Y_{i,t-1} + \beta_6 \sum Z_t + \varepsilon_{i,t}$$

All of our variables, except for the capital account openness index, central bank independence (CBI), and government partisanship, are differenced, as panels exhibit either consistently increasing or decreasing trends, rather than stochastic processes required by time series. $HP_{i,t}$ is real housing price growth (*percentage change*[9] from the previous year) in country i in year t. $y_{i,t-1}$ is per capita real income growth (*percentage change* from the previous year) in country i in year t-1. $pop_{i,t-1}$, a rough proxy of housing stock demand, is population growth (*percentage change* from the previous year) in country i in year t-1. Real housing price data (private dwellings) stem from OECD (2012a), except for Austria and Portugal (OECD data missing), whose residential property price data came from the Bank of International Settlements (2014). Population and real income growth data stem from the OECD (2014).

$\sum X_{i,t-1}$ is a vector of lagged financial variables. This includes the lagged real interest rate (*differenced* from the previous year), the lagged ratio of domestic credit provided by financial institutions to the private sector as a ratio of GDP (a proxy for financial *depth*, this ratio is also *differenced* from the previous year), and the lagged capital account openness index (a proxy of financial *liberalization*) for country i in year t-1. The capital account index measures capital and current account restrictions, requirements to surrender export proceeds, and the presence of multiple exchange rates: higher values indicate greater capital account openness. Real interest rate data stems from the EU's

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[9] Percentage changes are expressed from 0-100 rather 0-1.

AMECO Database (2014), domestic credit ratios from the World Bank (2014), and the capital account openness index stems from Karcher and Steinberg's (2012) revised measure of the Chinn-Ito (2006) index.

$\sum Y_{i,t-1}$ is a vector of lagged domestic political controls. We include partisanship, the lagged proportion of cabinet seats occupied by right parties[10], because right parties, given their capital/business leanings, may be more prone towards passing mortgage-credit-friendly policies than left parties. We also include the lagged CBI index as a rough proxy for the inflation aversion of the domestic central bank. The presence of a supranational central bank (the European Central Bank) within our panel poses some problems for comparing EMU to non-EMU countries: the ECB does not have the same inflation monitoring power for individual Eurozone countries as national central banks do. Therefore, we weight the CBI index by the proportion of national GDP to the central bank's jurisdiction.[11] For countries with their own central banks, this weight equals 1 (national GDP *is* the central bank's jurisdiction). For EMU countries, this weight equals the ratio of national output to the Eurozone's output. Partisanship data stems from Swank (2006), while the CBI index stems from Cukierman (1992), with updated data from Polillo and Gullién (2005). EMU country's output weights to Eurozone GDP are calculated using data from the EU AMECO Database (2014).

$\sum Z_t$ is a vector of (n-1) year dummies to control for omitted time shocks. Optimally, our analysis would include measures of national policies towards mortgage debt accumulation (mortgage tax subsidies, maximum loan to value

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[10] Our results remain unchanged if we use the proportion of legislative seats occupied by right parties.

[11] Our results remain unchanged if we do not weight the CBI index.

ratios, etc.). However this data is not available on a consistent time series basis. OECD (2011) possesses cross-sectional data on mortgage tax subsidies for 2009 only and maximum loan-to-value ratios for 1990 and 2000 only. Therefore, we omitted these variables from our regressions, although we incorporate them into our case study analysis, where we tease out the causal mechanism. Finally, all independent variables, but *not* our dependent variable, are *standardized* making it possible to compare the impact magnitudes of the independent variables on housing price growth (beta coefficients are interpreted as "a one standard deviation change in X leads to a β% change in housing prices").

We begin our analysis with a standard OLS estimator with country clustered standard errors to control for contemporaneous correlation and panel heteroskedasticity.[12] A distributive lag model should blunt the likelihood of reverse causality between housing price and income growth: present housing prices should not influence past income growth. However, if housing price shocks linger for more than one period, endogeneity between these two variables may continue to exist. Therefore, we use instrumental variable regression (IV or two stage least squares, 2SLS), using lagged (n-1) coordination regime dummies (pattern bargaining, state-imposed coordination, state-led wage pacts, no coordination, and peak-level bargaining,[13] with non-state-led wage pacts as the omitted baseline category) as instruments for lagged income growth.[14] Because we select non-state-led wage pacts as the baseline category, identified by some as the regime that best

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[12] A Wooldridge test for auto-correlation (F-statistic of 66.60, p-value=0.000) and an LR test of panel heteroskedasticity (Chi-squared statistic of 71.51, p-value=0.000) for Model I in Table 1 suggest that both first order serial correlation and panel heteroskedasticity are present in the baseline model.

[13] Our results below remain consistent when we differentiate between sheltered vs exposed sector dominated peak-level bargaining.

[14] We also estimated our baseline model with the Arellano–Bond (1991) general method of moments estimator. Though this estimator is more appropriate for panels where cross-sectional units outnumber time units, it produced results similar to those in Tables 1 and 2.

enhances the sheltered sector's political bargaining power (Brandl, 2012; Johnston et al, 2014), it is possible that all our coordination regime dummies will be significantly negative in the first stage. Our coordination regime data for 1980-2003 and 2004-2007 stem from Brandl (2012) and Johnston et al (2014), respectively.

In order to act as suitable instruments, our coordination dummies must be relevant (significantly correlated with income growth), and exogenous (not correlated with the error term in the second stage regression). First stage results assessing the influence of coordination regimes on real income growth are jointly significant, validating the first requirement. We present the joint F-test of significance, and in all models, the F-statistic exceeds 10, the threshold which distinguishes between weakly significant (<10) and strongly significant (>10) instruments (Stock and Yogo, 2005). Though we assume that wage coordination regimes' influence on housing prices operates *solely* through their effect on income growth, it is impossible to be completely sure that our instruments are fully exogenous as one cannot formally test this. However, given the inclusion of various controls, we account for omitted variables that may cause our instruments to be endogenous to housing price growth, increasing the probability of their exogeneity. Export-friendly coordination regimes may be more typical of governments with greater inflation aversion or resistance towards credit expansion, both of which have important implications for housing prices. However, the CBI index proxies as a country's central bank's aversion to inflation. Additionally, by including cabinet right-party share and the expansion of the ratio of domestic credit provision to GDP in our models, we also control for possible partisan determinants of inflation/credit expansion, highlighted in the CPE literature.

Finally, both our OLS and IV estimators include random effects rather than country-specific effects. While these dummies control for omitted time-invariant country effects (although such omitted variables are more pressing for level effects, rather than differenced/growth-rate effects, which our models estimate), their incorporation into the IV/2SLS analysis is problematic for the coordination regime dummies, as well as for the CBI index. Some countries (Canada, the UK and the US) exhibit no change in their coordination regimes over the entire period, meaning that their country dummies would be perfectly correlated with their coordination regimes (see Plümper et al, 2005, for a general critique on the use of fixed effects when incorporating institutional controls).[15] This is substantiated in our regression output: in our IV/2SLS regressions, the inclusion of country dummies rendered the coordination regime dummies insignificant in the first stage (results available in an online appendix).

However, realizing that income growth and mortgage credit demand may serve as substitutes rather than complements for credit-permissive liberal market economies[16] (the UK and US) where mortgage securitization was central to their growth regimes (Hay 2009), we introduce US and UK country dummy interactions with lagged income growth in the *OLS* model to determine if income's effect on housing prices for these economies is different to the wider OECD sample.

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[15] If we incorporate a full list of (n-1) country dummies within our *OLS* estimator, which does not incorporate the coordination regime dummies, our results in Table 1 remain unchanged (results available in an online appendix).

[16] Canada and Australia are stark contrasts to credit-permissive liberal-market economies. The former's financial sector was resilient to the 2008 financial crisis, given its higher (pre-crisis) capital requirements and greater leverage restrictions. Due to tighter regulations (Canadian banks cannot offer mortgages with less than 5% down), only 3% of Canadian mortgages were subprime in 2005, compared to 15% in the US (Haltom, 2013). Australia also weathered the 2008 financial crisis well, given its banking sector's cautious approach to home lending and limited, little history with subprime lending. Australian banks were encouraged by government policy to avoid risky loans (Hill, 2012).

Results

Table 1 presents our results for the OLS estimator. Our baseline model (Model I, Table 1) excludes the capital account openness index, as this variable is largely absent for Belgium, which would exclude it from our sample. Model II in Table 1 includes the capital account openness index. Model III, Table 1, includes our domestic political controls. Model IV presents results for the US and UK country dummy interactions with lagged income growth. Model V presents results for a two year, rather than one year, lag of the independent variables. Model VI presents an alternative measure of income growth that examines the extent to which wage growth in the sheltered *non-market services* sector (a weighted composite of public administration and defence, education, and health/social work) exceeds wage growth in the manufacturing sector (data stemming from EU KLEMS, 2010). Coordination regimes that grant the export sector or the state greater political leverage in wage bargaining tend to exhibit smaller or negative values in wage growth differentials between the non-market services and manufacturing sector, while those that grant unions in the non-tradable sectors greater bargaining power tend to exhibit larger differentials. Therefore, if this variable is high (non-market services wage growth outpaces that in the manufacturing sector), housing price growth, driven by sheltered sector wage inflation, should increase.

Table 1: OLS estimates for the determinants of real housing price growth

Standardized Independent Variables	I	II	III	IV	V	V
Population Growth (t-1)	0.226 (0.251)	0.252 (0.250)	0.267 (0.265)	0.333 (0.306)		0.564** (0.224)
Δ Real Interest Rate (t-1)	-0.696** (0.279)	-0.720** (0.301)	-0.716** (0.301)	-0.78*** (0.301)		-0.663* (0.350)
Δ Private Credit to GDP (t-1)	0.337 (0.242)	0.315 (0.257)	0.313 (0.257)	0.274 (0.247)		0.424 (0.327)
Real Income Growth (t-1)	3.043*** (0.406)	3.062*** (0.381)	3.082*** (0.382)	3.106*** (0.404)		
Capital Account Liberalization Index (t-1)		-0.368 (0.476)	-0.295 (0.483)	-0.442 (0.462)		-0.774 (0.496)
Proportion of Cabinet Seats occupied by right parties (t-1)			-0.251 (0.349)	-0.309 (0.358)		-0.094 (0.363)
Weighted CBI (t-1)			-0.004 (0.422)	0.031 (0.440)		-0.214 (0.571)
US Dummy				-0.160 (0.590)		
UK Dummy				2.225*** (0.420)		
US* Real Income Growth (t-1)				-2.16*** (0.559)		
UK* Real Income Growth (t-1)				0.621 (0.751)		
Difference in Non-Market Services and Manufacturing Sector wage growth (t-1)						0.572* (0.318)
Population Growth (t-2)					0.355** (0.149)	
Δ Real Interest Rate (t-2)					-0.698* (0.396)	
Δ Credit Growth (t-2)					0.07 (0.297)	
Real Income Growth (t-2)					1.880*** (0.396)	
Capital Account Liberalization Index (t-2)					0.35 (0.498)	
Proportion of Cabinet Seats occupied by right parties (t-2)					-0.443 (0.359)	
Weighted CBI (t-2)					0.037 (0.459)	
Constant	2.895*** (0.900)	3.123*** (0.863)	3.118*** (0.918)	3.216*** (0.867)	3.445*** (0.961)	3.552*** (1.029)
N	428	410	410	410	395	408
R-squared (overall)	0.396	0.397	0.398	0.410	0.319	0.272

Dependent variable is real housing price growth. Independent variables are standardized, dependent variable is non-standardized. Estimator used was a pooled cross-sectional, time series, random effects OLS estimator for 17 OECD economies from 1980 to 2007. N-1 time dummies included but not shown. Panel clustered standard errors provided in parentheses. *, **, and *** indicate significance at a 90%, 95%, and 99% confidence level.

Only two variables, real income growth and real interest rate reductions, are *consistently* significant within our OLS estimates, regardless of the lag structure used. Both exhibit the anticipated relationships (lagged income growth is positively associated with housing price growth, while lagged real interest rates reductions are associated with housing price increases). Income growth's beta coefficient, however, *exhibits a much larger magnitude than changes in the real interest rate*: a one-standard deviation increase in lagged real income growth is associated with an *annual* 3% increase in real housing prices, while a one standard deviation decrease in real interest rates is associated with a 0.7% annual housing price increase. Income's magnitude declines when using a two year lag structure, yet its impact is still more than double that of real interest rate movements.

When examining specific income effects for the UK and US (Model IV), the former does not exhibit a discernable difference from other OECD economies in the impact of lagged income growth on housing prices (given its insignificant interaction term). However, the US country dummy's interaction term is significantly negative, and largely cancels out the significantly positive (hierarchal) effect of lagged income growth. This result lends credence to the suggestion that income and (mortgage) credit serve as substitutes in the US, but complements throughout the rest of the OECD (including the UK).

When income growth is conceptualized in terms of sectoral wage differentials (i.e. the scale of sheltered sector wage push compared to that in manufacturing), the anticipated relationship was also significant: a one standard deviation increase in the lagged gap between sheltered and manufacturing sector wage growth, indicating sheltered sector wage push, is

associated with a 0.57% annual increase in housing prices. Our other financial variables, credit expansion and the capital account openness index, and domestic political controls displayed no significant relationship with housing price growth.[17] Lagged population growth corresponds with housing price growth in only two of the five models (its relationship is most significant in a second year lag structure).

According to results in Table 1, lagged income growth demonstrates a much stronger relationship with housing price growth than lagged real interest rate movements. However, income's impact may be upwardly biased (increases in housing prices place upward pressure on income growth, which in turn fuels housing prices). Table 2 presents our IV/2SLS regression results, which attempts to control for this. Model I is the baseline model without the capital account openness index. Model II includes the capital account openness index. Model III includes domestic political controls. In Model IV, Table 2, we further lag our coordination dummies: *two year* lags of the coordination regime dummies serve as the instruments for the *one year* lag of real income growth. We do this in order to determine whether incorporating for coordination regimes' *potentially* lagged effects on income growth influences income growth's beta coefficient in the second stage.

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[17] It is unlikely that this is due to imperfect multicollinearity as all independent variables display insignificant or small and weakly significant (pair-wise correlations of less than 0.15) with each other.

Table 2: IV/2SLS estimates for the determinants of housing price growth

Standardized Independent Variables	I	II	III	IV
Population Growth (t-1)	0.295	0.396*	0.407*	0.309
	(0.219)	(0.215)	(0.219)	(0.205)
Δ Real Interest Rate (t-1)	-0.666**	-0.695**	-0.693**	-0.541*
	(0.277)	(0.304)	(0.303)	(0.295)
Δ Private Credit to GDP (t-1)	0.365	0.377	0.371	0.348
	(0.238)	(0.267)	(0.263)	(0.258)
Real Income Growth (t-1)	2.273***	1.655**	1.686*	2.414**
	(0.684)	(0.826)	(0.949)	(1.075)
Capital Account Liberalization		-0.572	-0.506	-0.116
Index (t-1)		(0.513)	(0.543)	(0.413)
Proportion of Cabinet Seats			-0.168	-0.263
occupied by right parties (t-1)			(0.334)	(0.366)
Weighted CBI (t-1)			-0.093	-0.019
			(0.447)	(0.422)
Constant	3.009***	3.451***	3.386***	3.079***
	(0.825)	(0.822)	(0.925)	(0.849)
N	428	410	410	397
R-squared	0.388	0.369	0.371	0.398
First Stage: Dependent variable is standardized real income growth (t-1)				
Peak level bargaining (t-1)	-0.821*	-0.993**	-0.971**	
	(0.470)	(0.488)	(0.476)	
Pattern bargaining (t-1)	-0.813*	-0.933*	-0.885*	
	(0.457)	(0.499)	(0.481)	
State imposed coordination (t-1)	-1.041**	-1.208***	-1.195***	
	(0.445)	(0.441)	(0.431)	
State-led wage pacts (t-1)	-0.892*	-1.015**	-1.007**	
	(0.460)	(0.514)	(0.503)	
No coordination (t-1)	-0.807*	-0.918*	-0.887*	
	(0.470)	(0.518)	(0.501)	
Peak level bargaining (t-2)				-1.122**
				(0.448)
Pattern bargaining (t-2)				-1.004**
				(0.434)
State imposed coordination (t-2)				-1.383***
				(0.410)
State-led wage pacts (t-2)				-1.073**
				(0.448)
No coordination (t-2)				-0.975**
				(0.456)
N	428	410	410	397
R-squared	0.3987	0.4121	0.4144	0.4424
F-test of joint instrument significance	28.03***	31.73***	34.43***	23.01***

Dependent variable is real housing price growth. Independent variables in the second stage are standardized. Estimator used was a pooled cross-sectional time series random effects IV/2SLS estimator for 17 OECD economies from 1980 to 2007. N-1 time dummies included but not shown. For first stage regressions, non-instrument independent variables and constant term not shown. Panel clustered standard errors provided in parentheses. *, **, and *** indicate significance at a 90%, 95%, and 99% confidence level.

Table 2, first stage estimates conform largely to our hypotheses. Pattern bargaining, state imposed coordination, and state-led wage pacts exhibited lower annual real wage growth, on average, than the baseline category (non-state-led wage pacts). The other two coordination regimes also exhibited significantly (although for uncoordinated regimes, weakly significant) lower annual wage growth than non-state-led wage pacts: note that these wage pacts impose the least constraints on sheltered sector unions. When distinguishing between sheltered and export sector dominated peak bargaining regimes, peak level bargaining's negative coefficient was largely driven by the latter.

The impact of lagged real income growth on changes in real housing prices is reduced in the IV regressions. However, the magnitude of lagged income growth's impact remains substantial, and continues to exceed the predicted effects of changes in lagged real interest rate. According to results in Table 2, a one standard deviation increase in lagged real income is associated with a 1.6-2.4% annual increase in housing prices, while the impact of a lagged one standard deviation decrease in real interest rates is associated with only a 0.6-0.7% annual increase in housing prices. Similar to the OLS models, financial and other domestic political variables displayed no significant association with housing prices.

Results in Tables 1 and 2 provide robust empirical evidence of the primacy of income growth's influence on housing prices. Income exhibited the largest impact on housing price growth of all variables examined, although its impact was negligible for the US, even when attempting to correct for endogeneity via instrumental variables. While the impact of changes in real interest rates was also significant, its magnitude was nowhere near that of income growth.

Finally, variables measuring broader trends in financial liberalization and financial depth displayed no significant effect. To better assess how these wage-setting regimes, and their underlying sectoral class politics, influence housing prices, we examine the causal mechanisms underlying the statistical correlations through a paired case study analysis of Ireland and the Netherlands.

Primed for housing bubbles: A comparison of Ireland and the Netherlands

Ireland and the Netherlands provide a useful (method of difference) case study design to examine the influence of wage-setting institutions on housing bubbles. During the 1990s, both countries had similar trajectories in their housing markets. Ireland and the Netherlands had the largest housing price increases in nominal and real terms in the OECD. Between 1990 and 2000, nominal/real housing prices increased by 173%/112% in the Netherlands and 170%/99% in Ireland (OECD, 2012). Yet while both countries experienced significant housing prices growth during the 1990s, they experienced divergent real-estate price trends during the (pre-financial crisis) 2000s. In Ireland, housing price growth turned into a *bubble* between 2002 and 2007. Nominal housing prices grew by 105%, the third highest in the OECD. The Netherlands, on the other hand, witnessed a lull in housing price growth. Between 2002 and 2007, nominal housing prices grew by only 45%, ranking 15th in the OECD housing price growth, whereas real housing price growth in the Netherlands for the same period was roughly a third of Ireland's (see Figure 5).

31

Figure 5: Real housing price index for Ireland and the Netherlands (1980-2007)
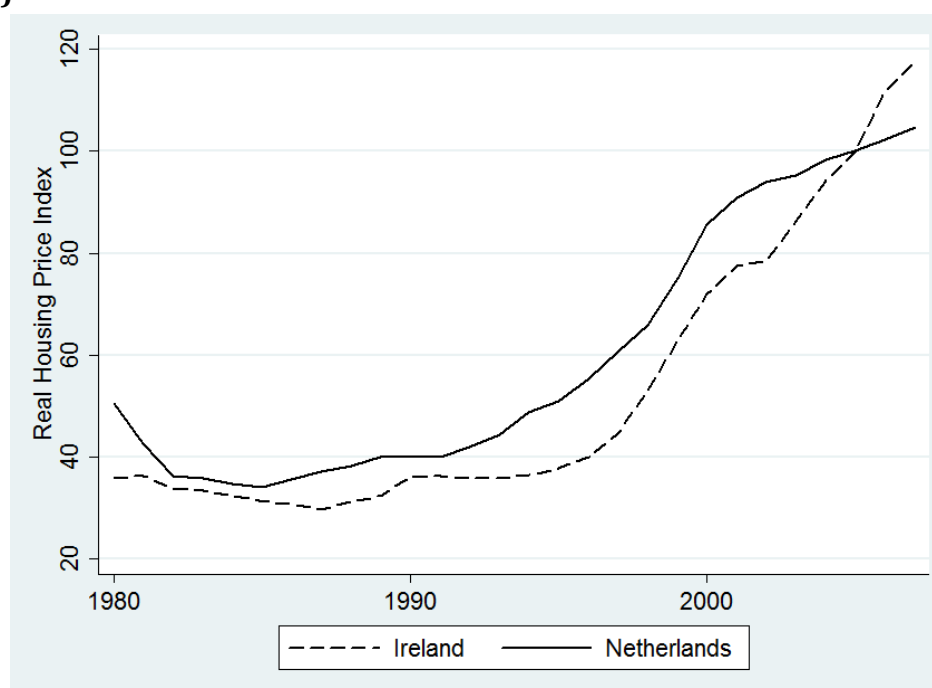
Housing price data from the OECD (2012a)

Why did Ireland's rapid increase in housing prices during the 1990s turn into a *bubble* whereas it did not in the Netherlands? Several supply-side and demand-side determinants can be ruled out given that both countries shared these characteristics. Both Ireland and the Netherlands realized a reduction in their nominal interest rates during the 1990s. Both countries also witnessed employment/growth miracles in the late 1990s and early 2000s, stimulating domestic demand. Much of the Dutch employment miracle concentrated in part-time employment, with a significant proportion of married women entering the part-time labor force (Salverda, 2005). Yet the deregulation of Dutch mortgage lending matched these part-time employment trends, making it possible for (part-time) second household incomes to qualify for loan-to-income mortgage limits (Schwartz and Seabrook, 2008).

Other supply-side determinants of housing prices that differ between the two countries can also be ruled out, as they suggest that a housing bubble should

have emerged in the Netherlands rather than Ireland. First, the Netherlands has one of the most generous housing credit markets in the OECD. In 2000, the Netherlands had the highest maximum loan-to-value ratios in the OECD: the maximum loan a buyer could take out in the Netherlands was 115% of the home's value, compared to a maximum limit of 90% in Ireland (Andrews, Caldera Sánchez, and Johansson, 2011).[18] Though maximum loan-to-value ratios may not suitably gauge credit generosity, as such values are limited to a country's least risky homebuyers, similar dynamics emerge when examining typical/average loan-to-value ratios. In 2002, the Dutch typical loan-to-value ratio was 90%, growing to 115% by 2008, well above Ireland's 66% ratio (Schwartz and Seabrooke, 2008; Vandevyvere and Zenthöfer, 2012).

The Netherlands also has the most generous tax relief on mortgage interest in the OECD. In 2009, the gap between the market interest rate on (prime) home loans and the after-tax debt financing costs of homeownership was just over 1.6%, compared to 0.3% in Ireland (OECD, 2011). Rent control is also stricter in the Netherlands than in Ireland, due to the presence of a large rental sector that is dominated by social housing (OECD, 2011). These restrictions should favor substitution away from rental properties towards home-ownership. Additionally, housing stock growth in the Netherlands was modest and kept pace with population growth (Cunha, Lambrecht, and Pawlina, 2009). All of these supply-side factors suggest that leading into the 2008 global financial crisis, the Dutch housing market should have been more bubble prone than Ireland's. Yet after the early 2000s, Dutch housing prices flat-lined, while Irish housing prices continued to grow.

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[18] High loan-to-value ratios should indicate that Dutch borrowers may be more prone towards default. However, unlike the US mortgage market, the passing on of credit risk through mortgage securitization was comparatively rare in the Netherlands, which explains why monitoring problems behind home finance have not been so severe in the country and why lending standards have not been loosened in the 2000s (Cunha, Lambrecht, and Pawlina, 2009).

One crucial difference between Ireland and the Netherlands that may explain their diverging housing price dynamics (and mortgage-demand expansion) in the mid-2000s was how *wage-setting institutions* influenced income dynamics in both countries. Both Ireland and the Netherlands entered EMU with labor market shortages, and these shortages placed upwards pressures on wages. By 2001, both countries arrived at a price spiral juncture; Ireland possessed the highest inflation rate in EMU, and the Netherlands possessed the third highest (OECD, 2014). What differed between these two countries, which had significant implications for income growth from 2002 onwards, and in turn demand for housing prices, was the domestic political *response* to these inflation dynamics.

In the Netherlands, the 2001 inflation rate of 4.2%, precipitated an acute sense of crisis; the country prided itself on its low inflation rates and it had not witnessed inflation higher than 4% since 1982 (OECD, 2014). Prompted by government action, trade unions and employers immediately agreed to a wage ceiling in late 2002, and wage freezes for 2004 and 2005 (Grünell, 2002; Van het Kaar, 2003). These wage pacts slowed income growth in the country considerably, and *nominal* hourly wage growth in the non-market sheltered sectors (public administration and defense, healthcare and social work, and education) declined from 5.3% in 2001 to 1.7% by 2005, see Figure 6). Such wage dynamics have conspicuous correlations with the lull in Dutch housing price growth.

Figure 6: Hourly Nominal Wage Growth in the Manufacturing and the (Sheltered) Non-Market Services Sectors (1990-2007)
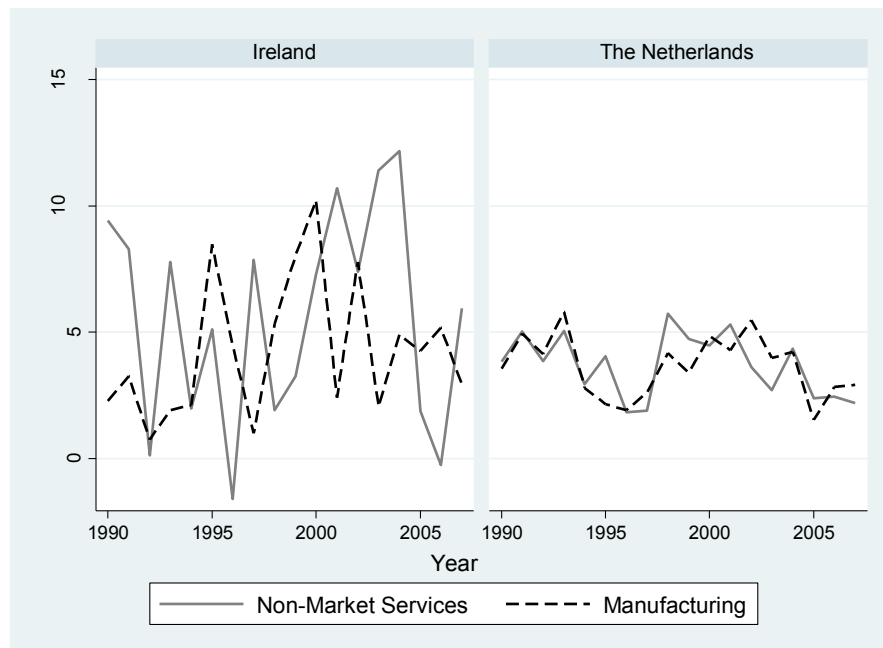
Wage data from EU KLEMS (2010). Manufacturing sector is International Standard Industrial Classification (ISIC) D. Non-Market sector is a weighted composite of public administration and defence (ISIC L), education (ISIC M), and health and social work (ISIC N).

In Ireland the opposite occurred. In the early 2000's the government and public sector unions established "*The Public Service Benchmarking Body*" to analyze the public-private pay differential. The government granted a wage increase, from 2003-2005, a once off payment that averaged 8.9% across the public sector. This was *in addition* to the national wage agreement, which granted a 12% increase during the period 2003-2005. A special review body was also established which granted further increases to senior public-sector employees. All of this was in addition to cuts in income tax, which further increased the after-tax wage. Quite unlike what occurred in the Netherlands, nominal wage growth in the sheltered domestic sectors *increased* from 7.4% in 2001 to 11.4% in 2003, reaching 9.5% in 2005. Such wage dynamics have a conspicuous correlation with the rapid *expansion* of credit that funded Irelands housing bubble from 2005 onwards. Both countries experienced

credit expansion and rising inflation. The Dutch responded by imposing a wage freeze. Ireland responded by expanding income growth.

Avoiding a bubble: Dutch corporatism's success in income moderation

The Netherlands entered the 2000s with one of its largest spikes in nominal and real housing prices. Though inflation was low, Dutch unions embarked on a wage push that led to the doubling of inflation within a year. This wage push was initiated by the public sector union Abva-Kabo, which represented almost 30% of the Federation Dutch Labor Movement's (FNV's) membership (Visser, 2000). In the 1980s and early 1990s, the Dutch government imposed severe moderated wage growth in the public sector. In 1998, Abva-Kabo declared that it would seek wage gains to compensate for these developments, and entered the 1998 bargaining round with a 5% target. By 2001, Abva-Kabo successfully concluded agreements that were only 0.2% below this benchmark. While FNV called for a moderate 3.5% nominal wage growth target in 1998, Abva-Kabo encouraged its affiliates to push higher, especially in the healthcare and education sectors where labor shortages were acute.

By mid-2001, wage increases were notably high in the social care and welfare sector, whose workers received annual wage increases of 7.5% and 5.25% respectively (EIRR, 2001). Abva-Kabo's wage push campaign did not confine itself to the public sector. Given the union's representative power within the FNV, its leaders also successfully pressured the Confederal FNV leadership to increase their general wage targets and abandon their traditional wage formula of setting wage increases in line with inflation and productivity developments (Van der Meer et al, 2005). Agreements concluded in 2001

provided for an average pay increase of 4.5% (higher than FNV's 4% target), and in services the average increase was 5.3% (Van het Kaar, 2001).

By 2001, it was apparent to Dutch employers that wage inflation was leading the country to competitive decline. Abva-Kabo, and its counter-part in the Federation of Christian Trade Unions (CNV), successfully used their representative strength to dominate peak-level pay setting policies. The critical turning point in Dutch collective bargaining came after the 2002 election. The election brought the return of a business-friendly center-right coalition, led by Jan-Peter Balkenende's Christian Democrats, into government.[19] Balkenende's reformist agenda became a crucial negotiating tool, and enabled government to persuade the FNV and CNV to agree to nation-wide wage restraint. In November, 2002, a centrally agreed wage ceiling of 2.5% was agreed upon by both FNV and CNV. In 2003, Government again convinced the unions to produce a second national wage pact, in return for several concessions on its social policy reform proposals. In October, 2003, the Dutch social partners agreed to a two year wage freeze in 2004 and 2005.

These three incomes policies facilitated considerable downward adjustments in Dutch wage growth. By 2001, Dutch nominal hourly wage growth was 5.3%, the highest level since 1982. After the imposition of the 2.5% nominal wage ceiling in 2003, and wage freezes in 2004 and 2005, nominal hourly wage growth declined to 1.68% in 2005, its lowest level since 1984 (EU KLEMS, 2010). These national wage pacts overlapped with the slowing of Dutch housing prices in the early 2000s (see Figure 5). While the Netherlands'

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[19] Balkenende's first coalition, with the populist Pim Fortuyn List (LFP) party and the liberals (VVD) collapsed in November, 2002, due to internal conflicts within LFP. Elections in January, 2003 brought the return of CDA to government, with the VVD and the progressive liberals (D-66).

generous policies towards mortgage credit accumulation did not change during the 2000s, the production of three national wage pacts led to a prominent decline in income growth, reducing the capacity of households to accumulate financial assets and to leverage housing wealth. In resorting back to a coordinated bargaining framework, albeit temporarily, that reduced income growth in its inflationary non-tradable sectors, the Dutch were able to reduce households' consumption on large durable assets, slowing housing prices in the early 2000s.

Fuelling the bubble: Irish corporatism's inability to moderate incomes

From the late 1980s to 1990's Ireland instituted a centralized wage bargaining regime aimed at generating national competitiveness via coordinated public and private sector wage restraint (Regan 2012). Wage restraint, flexible labor markets and low corporate taxes generated a distinct export led growth model that became colloquially known as the "Celtic Tiger". By 1999, in a context of rapid economic and employment growth, public sector unions in the health, administrative and educational sectors, in launched a wage push campaign. Their wage drive gathered popular support after various teaching, nursing and police officer strikes. They also gathered broad political support from larger industrial and private-sector unions. All unions agreed that the EMU was driving up domestic inflation and needed to be compensated with wage increases.

In 1999 a centre-right coalition, led by a populist Fianna Fáil (FF) government, negotiated a three-year wage pact called the Programme for Prosperity and Fairness (PPF). This was the first wage-pact negotiated in the absence of external exchange rate pressure, and based around a very generous national

tax-based incomes policy. PPF granted a 15.5% wage increase that averaged 5.5% per annum from 1999 to 2002. It also granted a once off 'catch up' increase of 3% to teachers and civil servants. In addition it "guaranteed" that net take-home pay of all workers would increase by 25% after cuts in income tax. But most controversially, the PPF established a *"Public Service Benchmarking Body"* (PSBB), designed to review public sector pay and assess whether there was a growing wage differential between the public and private sector.

PPF was widely endorsed by the affiliates to the union confederation, ICTU. But from 2000-2002, wage-drift became widespread. ICTU and Ireland's major employers' associations, particularly in construction, were unable to discipline affiliated wage-setters at company or sectoral level. Wage inflation was at double-digit figures and public sector employees increasingly maintained that despite the generous terms of the PPF they were being left behind. In late 2002, and within this context, the PSBB reported its findings. It agreed with the professional associations in the public sector (and the FF government) that there was a growing pay differential, and recommended the government grant an average 9-11% pay increase to *all* public sector workers in addition to the PPF.

The PSBB covered 60% of the total public sector workforce. The first payment was sanctioned in May 2003, with the final phase paid in May 2005. The cost of PSBB was estimated at 1.1bn per annum or 3.5% of then net current government expenditure. Remarkably the findings and methodology of the report was *never* published (data was exempt from the provisions of the Freedom of Information Act), and its conclusions have since been falsified. In effect the PSBB was a political exercise by the FF government and the social

partners to end longstanding wage disputes within the public sector. The PPF agreed to a cumulative increase of between 18% and 21% over three years, whilst benchmarking added an additional 8.9%-25%.

In 2003 the government and social partners negotiated another national wage pact called "*Sustaining Progress*" (SP). SP granted an additional 13% increase to be paid within the 2003-2005 period. In the same year, a special review body for higher-paid public sector employees granted *additional* increases to senior civil servants, the judiciary, and government ministers. The outcome of the two wage pacts, the PSBB, and the special review body was a substantial increase in the public sector pay bill during the period 2001-2005, particularly at the top of the income distribution. The public sector wage premium, *after* controlling for all relevant characteristics such as age and education, grew from 7.7% in 2001 (before PSBB was paid) to 23.5% in 2006 (Kelly et al 2008). All of this increase in income conspicuously overlaps with the spike in house prices from 2003-2005 onwards. Rising household income *preceded* the peak of the credit expansion boom, which funded the property bubble.

Most analyses (see Kelly, 2009, for a definitive account) assume that bank lending alone explains the housing price bubble. Rising wage income is considered a symptom of this credit expansion. But this supply-side analysis misses the importance of where demand for credit is coming from. The rapid increase in public sector wages, particularly for high earners, *preceded* the 2005 credit boom. If credit expansion alone explains the house price bubble it would imply that had the government intervened to restrict loan-to-value ratios it could have been avoided. But the Dutch case contradicts this possibility. From 2001-2005 private sector credit, as a ratio of GDP, was actually *higher* in the Netherlands than in Ireland (World Bank, 2014). The

divergence in bank lending occurred after 2005. At the same time, from 2001-2005, Irish house prices increased by over 45% whereas they stabilized at a 10% in the Netherlands. What differed between the two countries was not *credit supply* but *wage* restraint. In line with our income and mortgage credit as "complements" hypothesis, the lull in Dutch incomes corresponded with a lull in Dutch housing prices during the 2000s, while Ireland's income boom corresponded with its housing bubble.

Income restraint was made possible in the Netherlands because of coordinated wage-setting institutions that prioritized the sectoral-class interests of an export-led political coalition. Social partners collectively reduced income growth and tamed the demand for credit. The opposite occurred in Ireland. Centralized wage setting became decoupled from the export economy, which operated autonomously from the wage bargaining process. Domestic banking interests dominated employer associations whilst the construction industry was closely connected to the FF government. Simultaneously, the trade union movement was dominated by the public sector. The outcome was a centralized wage bargaining regime built around a political coalition in the domestic non-tradable sectors, which failed to deliver wage moderation, thereby helping to fuel a credit boom that fed the country's housing bubble.

Conclusion

Our results suggest that income growth, and the wage-setting institutions that govern it, exhibit greater power in explaining housing price growth than broader financial variables. While our interactive model indicates that income growth's impact on housing prices in the US is minimal, lagged income growth is strongly correlated with housing price increases in other OECD economies, suggesting that income and mortgage credit may be complements. This is not to suggest the credit expansion does not matter, but that mortgage demand is more amplified by the impact of an income shock. In the midst of international trends, which have made mortgage debt instruments more plentiful and cheaper, countries with wage setting institutions led by the export sector, continued to experience moderated housing price growth. Countries with wage setting institutions that were shaped by non-tradable sectors, on the other hand, were more prone towards the devastating housing bubbles outlined in the IPE literature.

Our results suggest that in an age of global finance, domestic sectoral-class politics continue to exert an important influence on macroeconomic outcomes. Financial liberalization and the international mobility of capital have substantially increased the price elasticity of the supply of debt instruments, granting significant power to banks in extending (mortgage) credit. But contrary to these broader international financial trends, demand for borrowing, which revolves around income growth, remains deeply ingrained in *domestic* political economies. Most policy discussion in the aftermath of the crises has focused on the role of the state in regulating credit supply. Our research suggests that state intervention in shaping and coordinating the outcomes of wage outcomes is also crucial, especially

outside of the US. Though capital mobility and financial liberalization have worsened the exposure of domestic economies to financial volatility, wage coordination regimes that are led by political coalitions in the export sector may blunt some of the worst effects of these trends, thereby insulating these countries from the external risks of globalized capital.

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Appendix A: Sectoral Wage Coordination Regimes for 17 OECD Countries (1980-2007)

Country	Export-Sector Favoring			Sheltered-Sector Favoring		
	Pattern bargaining	*State-imposed*	*State-led wage pacts*	*Peak bargaining*	*Non-state-led wage pacts*	*Uncoordinated*
Australia	1981-1982	1980	1983-1992	1993-1996 (E)		1997-2007
Austria	1984-2007			1980-1983 (E)		
Belgium		1982-1985	1994-2007	1980 (S), 1986-1993 (S)	1981	
Canada						1980-2007
Denmark	1981-1982	1980, 1985-1987, 1998	2000	1983-1984 (E), 1988-1997 (E), 1999 (E), 2001-2007 (E)		
Finland			1981-1982, 1988-1993, 1995-2000, 2002-2006	1983-1988 (E), 2001 (E) 2007 (E)		1980, 1994
France	1980-2007					
Germany	1980-1985, 1987-1999, 2001-2007			1986 (E), 2000 (E)		
Ireland				1981-1986 (S)	1980, 1987-2007	
Italy		1985		1980-1982 (S), 1986-1988 (S), 1990-1991 (S), 1994-2007 (S)	1983-1984, 1989, 1992-1993	
Japan	1980-2007					
The Netherlands		1980-1981	1982-1984, 1993-1995, 2002-2004	1985-1992 (E), 1996-2001 (E), 2005-2007 (E)		
Portugal		1980-1981		1982-1985 (S), 1989 (S), 1991 (S), 1993-1995 (S), 1998-2005 (S), 2007 (S)	1986-1988, 1990, 1992, 1996-1997, 2006	
Spain				1980-1981 (S), 1986-2007 (S)	1982-1985	
Sweden	1999-2007			1980-1994 (E)		1995-1998
United Kingdom						1980-2007
United States						1980-2007

E indicates export-dominated (peak bargaining). S indicates sheltered-dominated (peak bargaining). 1980-2003 data from Brandl (2012). 2004-2007 data from Johnston et al, 2014.

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