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These Little PIIGS Went to Market: Enterprise Policy and Divergent Recovery in European Periphery

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Enterprise Policy and Divergent Recovery in European Periphery

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Abstract: The 2008 financial crisis hit few places harder than the European periphery, where five states, Portugal, Italy, Ireland, Greece and Spain, came to be collectively known as the 'PIIGS'. Yet while the PIIGS experienced a similar adjustment to the crisis, the recoveries have shown significant divergence. Ireland, in particular, has stood out as a beacon of growth, not only in the PIIGS but in all of Europe. We challenge the prevailing narrative that Ireland's exemplary performance is due to its early and ardent adaptation of fiscal 'austerity' measures. Instead we argue that Ireland's path dependent, state-led, 'enterprise policy' situated Ireland to be a recipient of foreign direct investment driven by the low borrowing costs, brought on by the United States' Quantitative Easing (QE) programs. Using quantitative and qualitative investigation we find evidence that the latent enterprise policy mechanism – operationalized via the impact of QE on investment projects into Ireland (vis-à-vis the other PIIGS) - rather than increased wage competitiveness via austerity, accounts for Ireland's recovery from the crisis.

Keywords: Austerity, Crisis, Debt, Ireland, PIIGS, Enterprise Policy

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Introduction

The fury of the 2008 housing and financial crisis struck few places harder than in the countries of the Eurozone periphery. Massive shocks to growth, employment and public finance plunged Portugal, Greece and Ireland into international 'bailouts' and brought Spain and Italy to the brink of that shared fate. Financial markets, seizing on the long tradition of considering the poorer performing Southern European economies as 'Club Med', quickly brought Ireland into the group, with the now infamous political re-branding using the inflammatory moniker 'PIIGS'. This heuristic became synonymous with the crisis in the European periphery and has since been shown to drive convergent financial market treatment of the constituent members. Despite qualitatively distinct political economies, and national growth regimes, all countries were treated equally, with the implication that their bond yields soared above the Euro area core (Brazys and Hardiman 2015, Johnston and Regan 2015).

The PIIGS' common entry into crisis led to a common policy response popularly referred to by the shorthand of 'austerity'. Policy adjustments under the heading included macroeconomic stabilization, fiscal consolidation and supply-side structural reforms that were coordinated by the so-called 'Troika' of international institutions: the European Commission (EC), the European Central Bank (ECB), and the International Monetary Fund (IMF) (Blyth 2013). These austerity policies resulted in notable social consequences ranging from economic and electoral (Whiteley et. al 2015), to health-related (McKee et al. 2012) fallout and have generated high-profile public critiques (*see* Krugman 2012). The wisdom of the policy approach remains an open question, despite the concerns raised above and an ongoing technical debate rages between economists, including within the Troika institutions of the IMF (Blanchard and Leigh 2013) and ECB (Warmedinger et al. 2015).

A significant portion of the public debate over whether austerity 'works' revolves around the perceived success of the policies in Ireland. The European Commission[2], the Irish government, and external commentators[3] have all argued that Ireland's policies of macroeconomic stabilization and fiscal austerity have been central to its recovery. Indeed, after implementing an internal adjustment equivalent to 26 per cent of gross domestic product (GDP), Ireland has become one of the fastest growing economies in Europe, exceeding the other 'PIIGS' and the aggregate EU growth rate since 2011 (see figure 1 below). The suggested mechanism is as follows: the internal adjustment reduces labor costs, which in turn enables export firms to improve their competitiveness and expand external demand (Sinn 2014, Storm and Naastepad 2014). This expansion in external demand is made possible by holding down labor costs, which improve the real exchange rate within the context of monetary union, kick starting an *export led* recovery. Ireland is thus held up as the 'poster child' of austerity, and an example for others to 'take their medicine' if they want to return to international competitiveness (Robbins and Lapsley 2014). While this is an attractive argument to those who have been forced to defend the significant social adjustments that have followed in the wake of austerity policy, it does not explain the remarkable *divergence* in the recoveries of the five PIIGS countries. The remaining members and Greece in particular, have recovered much more slowly and to a much lesser degree than their Irish counterpart, despite even greater reductions in unit labor costs.

The diversity of economic outcomes among the PIIGS suggests that it may *not* have been the (commonly imposed) Troika policies of fiscal austerity or wage competitiveness that

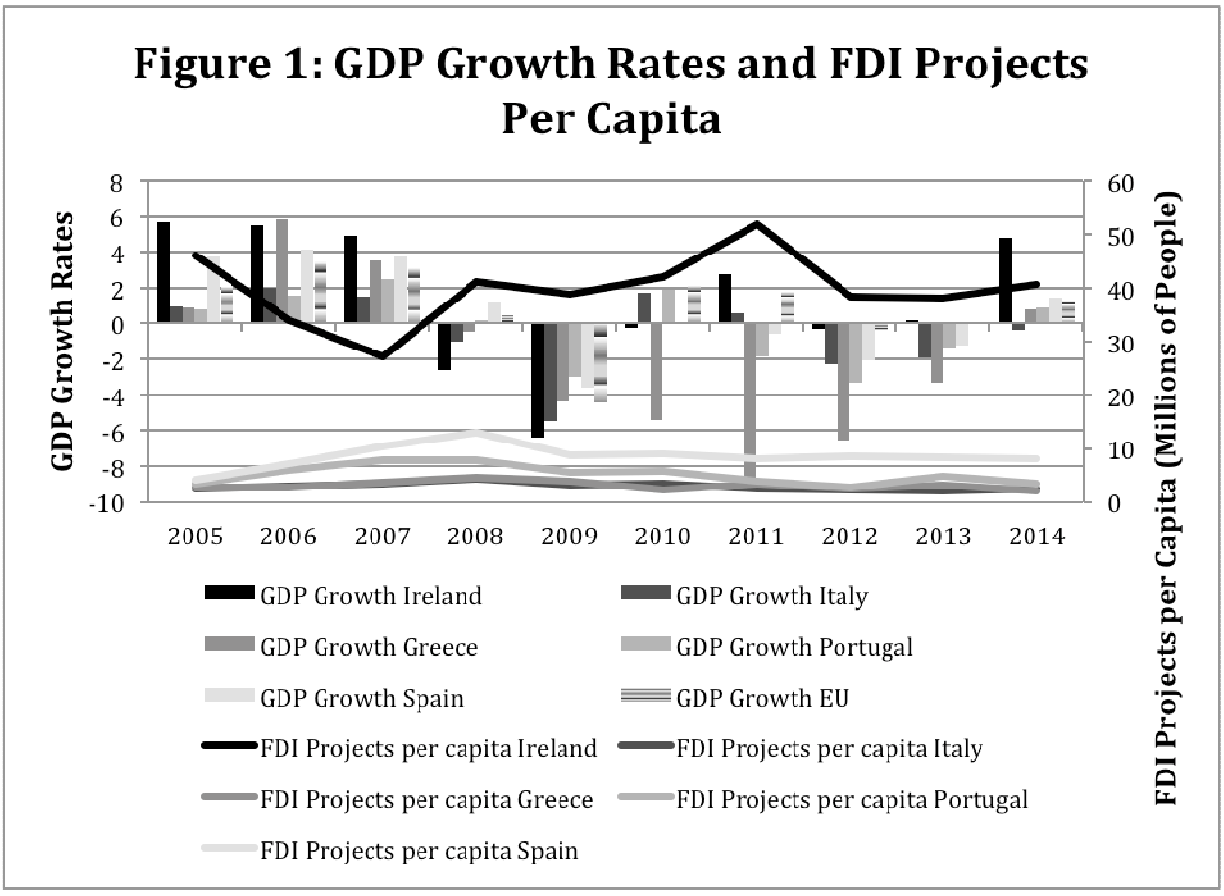
[2] http://www.breakingnews.ie/ireland/barroso-to-praise-people-of-ireland-for-courage-sacrifice-during-bailout-624243.html Accessed 15-06-15.
http://www.wsj.com/articles/SB10001424052702304911104576445583071882782 Accessed 15-06-15.
http://www.irishtimes.com/business/economy/austerity-policies-work-claim-ecb-economists-1.2244944 Accessed 15-06-15.

[3] http://www.independent.ie/business/world/the-axeman-cometh-with-praise-for-irelands-austerity-heroics-30926337.html Accessed 15-06-15.
http://www.irishcentral.com/news/bill-gates-backs-ireland-to-bounce-back-from-austerity-programme-188816361-237561391.html Accessed 15-06-15.
http://www.irishexaminer.com/austerity-focus/economic-impact/is-austerity-working-yes-238955.html Accessed 15-06-15.

returned Ireland to economic health. Indeed, we argue Ireland's recovery was the outcome of a path dependent and state-led enterprise policy of attracting large global firms into the Irish economy. We argue that Ireland's pre-crisis export strengths, and it's state-led developmental model, made it well positioned to attract foreign investment boosted by the low-cost financing that became available during the crisis, in particular from the US Treasury asset buying programs, commonly referred to as 'Quantitative Easing' (QE). QE has been suggested to stimulate investment in number of ways, including through the promotion of venture capital (VC) endeavours (Ito 2009). Our contention is that this increased availability of funding prompted firms, particularly in high-tech sectors, to expand their operations in/into Ireland. Our data suggests that as the US monetary authorities flooded markets with cheap cash, inward investment to Ireland began to boom, making it an attractive destination for firms looking to 'buy low'. This comparative advantage has marked Ireland as the odd one out in the litter of PIIGS, a fact largely overlooked by short-horizon financial markets. If the recovery of the 'poster child' is attributable to factors other than austerity than the argument for that policy response in other crisis-affected countries, especially in the ongoing Greek saga, is significantly weakened.

In the following section we develop our theoretical argument for why it was Ireland's unique state-led FDI developmental model or 'enterprise policy', rather than the Troika-led austerity response, which positioned Ireland for a faster and deeper recovery vis-à-vis the rest of the Euro periphery. We then attempt to evidence this theoretical argument in two ways. First, we operationalize the latent concept of 'enterprise policy' and conduct a quantitative *comparative* analysis of foreign investment decisions in the 'PIIGS' countries in the run up to, and during, the financial crisis. Our contention is that due to the structural conditions of Ireland's enterprise policy, foreign investment into Ireland following the 2008 crash responds to the US QE program rather than the Irish government's austerity-induced policies. Conversely, we expect to see little relationship between the US QE program and post-crisis FDI in the remaining 'PIIGS' who lacked these institutional underpinnings. Indeed, a quick visualization of the number of FDI projects per capita

reveals the qualitatively distinct performance of Ireland across the Euro periphery (figure 1). After analyzing and discussing this data, we pursue a *within-case study analysis* of Ireland's 'Silicon Docks' to flesh out the causal mechanism through which state agencies and 'enterprise policy' attracted US investment in the 'tech sectors', and the determinants of competitiveness for those exporting firms in the 'ICT sectors'. We conclude with thoughts on the implications of Ireland's experience for the other crisis afflicted countries of the Euro and for state-led responses to financial crises more broadly.



Sources: fDi Markets Database, World Bank - World Development Indicators, Eurostat, Author's Calculations.

Ireland's development model: Enterprise policy and the unlikely PIIGS.

Ever since the publication of Peter Katzenstein's classic study on 'small states in world markets' comparative and international political economy scholars have grappled with identifying the precise conditions that enable firms and governments to secure economic and employment prosperity (Katzenstein 1985). For Katzenstein the core factor enabling *small states* to overcome their position as 'price takers' in the international economy is industrial policy, and the capacity to generate strong export-growth in external markets. The perception of *vulnerability* generates a culture of social partnership, which in turn enables a close dialogue between policymakers and domestic exporting firms on the need to maintain competitiveness. Variance in how the state approaches *industrial policy* matters most in explaining how small economies adapt to the constraints of internationalization, and the extent to which they can nurture *export-led* growth.

In many ways Katzenstein's core observation on 'industrial policy' has been lost during the last two decades of comparative 'varieties of capitalism' scholarship, which has tended to underplay the role of the *state* in shaping national growth regimes. *Enterprise policy*, a more apt and contemporary term to describe what governments do, we suggest, is a set of strategic public sector decisions aimed at supporting economic and employment activity in the private sector[4]. One might expect, therefore, that enterprise policy would be central to the recovery strategy and the policy package of reforms within the Eurozone periphery. This, however, is not the case. In none of the memorandums of understanding (MoUs) signed between crisis-afflicted countries and the Troika has FDI, industrial, or enterprise policy been mentioned. Nor has it received any attention in the whole raft of economic reforms implemented at the European level, all of which are aimed at reducing

[4] Most economic sociology research on 'enterprise policy' is focused on the micro foundations for 'entrepreneurship' and those public policies aimed at supporting small 'start ups' (see O'Riain, 2014). We adopt a broader political economy use of the term and conceptualize enterprise policy as public sector decisions aimed at nurturing a specific type of 'growth regime'. In the Irish case these are policies aimed at attracting FDI from global firms.

macroeconomic imbalances between countries. The European policy recipe assumes that export-led growth in a period of austerity will come from supply-side structural reform rather than state-led industrial policies (Buti 2014, Buti & Carnot 2012).

The policy package of structural reform is based around the economic idea that if labor and product markets are liberalized, costs will be reduced and firms will generate the conditions for export-led growth. This view of cost competitiveness is sceptical of enterprise policy, as the latter implies direct state intervention in the economy, aimed at 'picking winners'. From the Troika's perspective, the only role for the state is to stabilize the economy through fiscal stabilization measures and, where possible, to privatize the semi-state sectors to increase market efficiencies. The scepticism toward what was previously called 'industrial policy' is not without good reason, as there is ample evidence to suggest that direct intervention by the public sector in shaping the export-market is directly associated with clientelism. It is not unreasonable, therefore, to suggest that a close relationship between political parties and domestic business interests in the Euro periphery will lead to regulatory capture by rent-seeking interests. Hence, from the European Commission's perspective the only role for governments is to implement a stable legal and institutional framework for market competition, and investment more broadly.

Whilst this perspective is theoretically attractive and based on a legitimate concern to avoid the worst effects of clientelism, it empirically ignores the crucial role of developmental state agencies, and industrial and enterprise policies more broadly, in shaping export-led growth regimes. As illustrated by the developmental state literature (O Riain 2000, Breznitz 2007, Block 2008, Ornston 2012) an *activist* state is a necessary prerequisite for securing the institutional conditions for growth in peripheral market economies. Late developers require an autonomous, powerful and centralized bureaucracy to industrialize, and the East Asian Tigers illustrate the point. A more recent variant of this literature suggests that what matters most is not a centralized bureaucracy but an autonomous public sector agent capable of facilitating sectoral development in industries with clear technological trajectories. In countries such as Finland, Taiwan and Israel high-

tech growth occurred because of a long standing institutional commitment by 'peripheral public sector agents' to developing national systems of innovation (Breznitz and Ornston 2014).

Prior to the financialized property boom that afflicted the Irish economy, Ireland was regularly cited in this 'developmental state' literature. O'Riain (2004) pioneered the study on the Developmental Network State (DNS), paying particular attention to the pattern of state-industry relations in the indigenous Irish software industry. The core argument was that local firms are embedded in social networks, and depend on a whole variety of external supports - for skills, financing, marketing, information - to become successful enterprises. The state and domestic developmental agencies are the core nexus around which these networks are built.

We do not take issue with this DNS perspective but our theoretical argument, which is built around a comparative capitalism framework, conceptualises 'enterprise and industrial policy' differently. We consider it a strategy by public sector agents to attract large *global multinational firms* into the domestic economy via low corporate taxes, a skilled labor pool, and other locational advantages. Public sector agencies attract these global firms through informal networking, hard political bargaining and a willingness to partner in a readymade business model[5]. But once the global firm establishes itself their presence creates a *regional-innovation cluster* that pulls in additional investment within the same sector (see case study). Over time this innovation cluster creates an expanding domestic labor market of employees with experience of working in the flexible culture of US MNCs, which, in turn, attracts more companies to establish their operations in the same region. This creates an embedded *labor market effect*, pooling skilled employees from across the EU, and similar to the theory put forth by Enrico Moretti (2012), with one crucial exception. The construction of Ireland's innovation cluster, particularly in ICT, is less the effect of liberal market competition or Schumpeterian entrepreneurial activity but a direct outcome of an activist

[5] The executives of tech firms regularly cite this presence of a readymade business model (presented to companies by the state development agencies) as it immediately enables them to overcome collective action problems in the market. See http://www.managementtoday.co.uk/news/1353663/the-return-celtic-tiger/

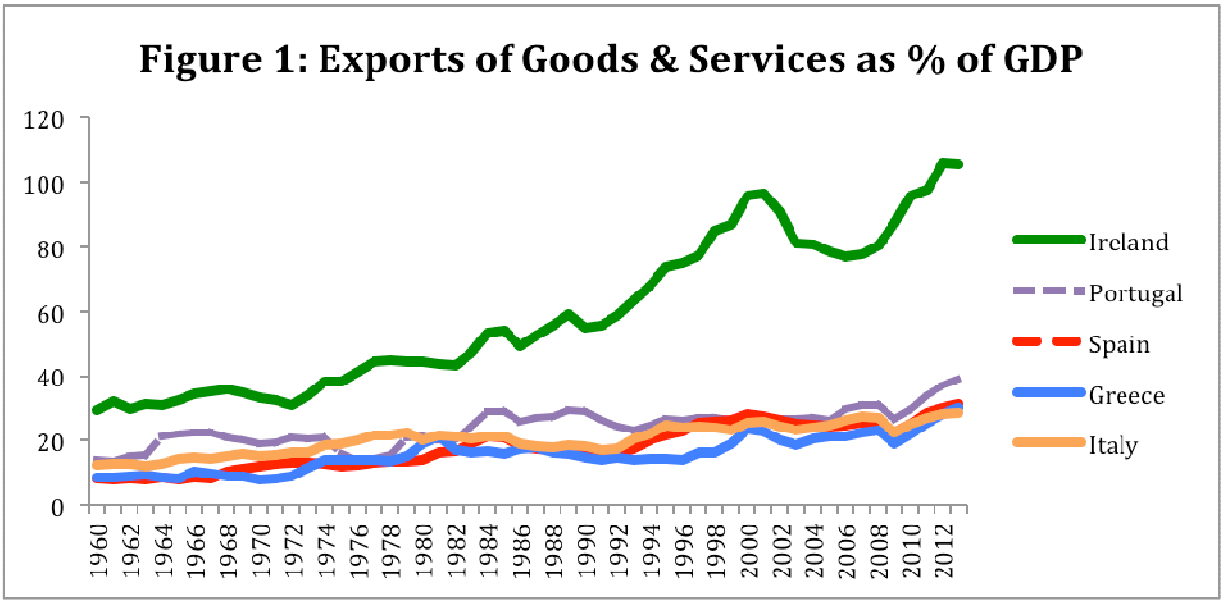
state-led developmental strategy to build an export oriented growth regime in high-technology sectors. This is what we refer to as 'enterprise policy'.

Exports account for 116 per cent of Irish GDP, and almost 90 per cent of this comes from foreign owned global US multinationals[6]. Figure 2 shows the extent of the Irish export-led recovery vis-à-vis the other crisis afflicted countries of the Eurozone, whilst figure 3 illustrates that underpinning the Irish export resurgence since 2008 is an expansion in *internationally traded business services*: internet-tech, biotech, e-commerce and marketing. International services now account for 55 per cent of Irish exports and ICT computer services account for over 50 per cent of this growth[7]. The export recovery that took off in 2009 is primarily shaped by the presence and expansion of US MNCs in the tech sector: Google, Paypal, Oracle, Facebook, Adobe, Linked-in and Microsoft (see case study for more sectoral detail). Total service exports account for approximately 90 billion of Irish exports and these global tech firms now account for around 40 billion of this[8]. Perhaps most importantly, for the argument being developed here, is that these tech-firms were increasing wages and expanding employment before, during and after the Euro crisis. Unlike the low-tech and declining manufacturing sectors these firms operate in price-inelastic markets that are relatively immune from labor cost competitiveness, and the compression in domestic demand associated with the Troika fiscal adjustment.

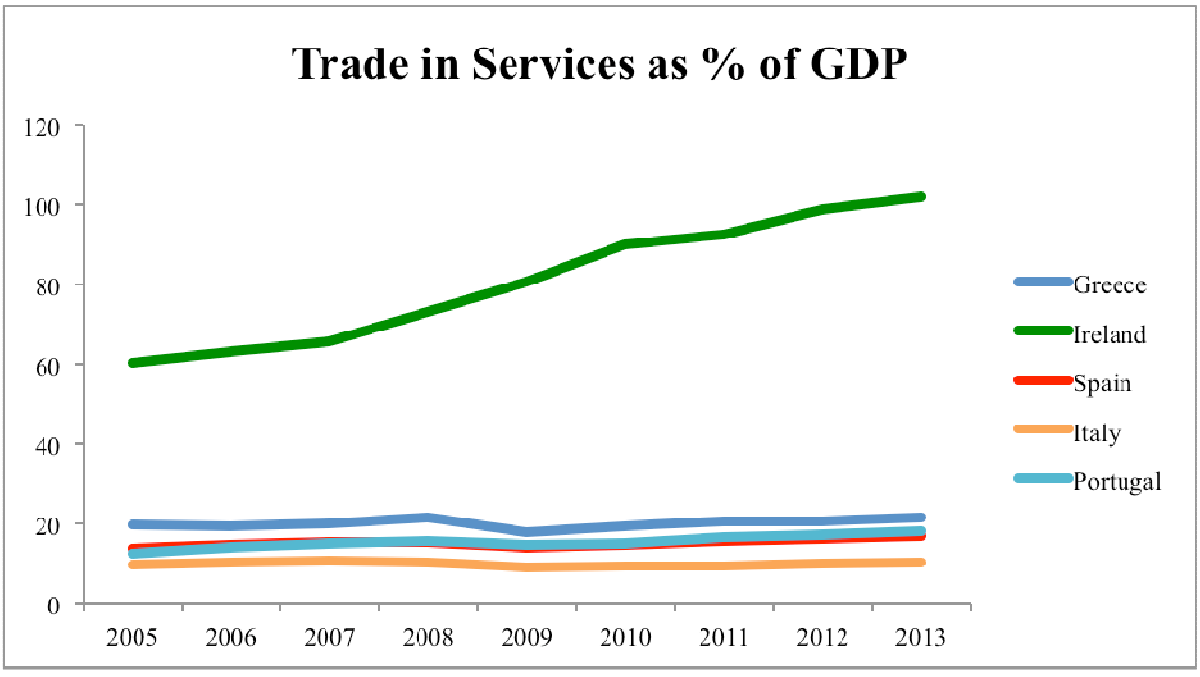
[6] See Irish Business and Employers Confederation http://ibec.ie/Sectors/ICT/ICT.nsf/vPages/Papers_and_Sector_Data~sector-profile?OpenDocument Accessed 20-08-2015

[7] The overall main driver of Irish export growth, however, is the pharmaceutical sector (see Barry & Bergin 2012),

[8] http://www.finfacts.ie/irishfinancenews/article_1027837.shtml Accessed 06-06-15



Source: World Bank, World Development Indicators



Source: World Bank, World Development Indicators

Rethinking Comparative Capitalism: Enterprise policy and Growth regimes

In line with recent developments in the varieties of capitalism literature (Hassel 2014, Hall 2014, Baccaro & Pontusson 2015, Johnston & Regan 2015) we identify comparative differences in *growth regimes* (demand-led and export-led) as a central factor in explaining the differentiated effect of, and recovery from, the financial crisis on the 'PIIGS'. Ireland has an export-led growth regime facilitated by an FDI-oriented enterprise policy (that got shrouded out in the midst of a property bubble) whereas Southern European countries do not. Aggregate *demand* is shaped by export growth. Furthermore, Ireland's growth regime is not built around the cost competitiveness model of German manufacturing (Baccaro & Pontusson 2015), but by firms in high wage, price inelastic, and internationally traded service sectors that are reliant upon a labor market that has high percentage of university graduates (Ansell & Gingrich 2013). Unpacking how service-oriented and manufacturing-oriented export growth regimes differ is beyond the scope of this paper, but it is important to note that the cost competitiveness argument underpinning the Troika adjustment primarily applies to traditional manufacturing, and not globally traded services.

Ireland's export-oriented developmental model is built around a longstanding institutional commitment by public sector agencies to attract inward investment from global firms in high-technology sectors. Contrary to the classic 'Varieties of Capitalism perspective' the core actor shaping this development is the *state-sponsored* Irish Industrial Development Agency (IDA). A key factor underpinning the IDA's success in attracting FDI, and their capacity to build a close relationship with global firms, is their peripheral public sector status (Breznitz and Ornston 2014). To be more precise, the IDA's strategies are successful not because of a specific administrative *structure* but because state developmental agencies have the autonomy to operate independently from the civil service. This is quite unlike the developmental agencies that exist in consumption-oriented economies such Portugal, Greece, Spain and Italy[9]. The IDA is specifically tasked with promoting and attracting

[9] However, one could argue that the IDA and the state have been 'captured' by the interests of the FDI sectors, which can be considered a different variant of the clientalistic relationship in southern Europe.

inward FDI in emergent and high growth sectors. This task of attracting investment from high-growth sectors, and most recently from 'born on the internet' firms, means that unlike individual companies, or venture capital funds, their *raison d'être* is a broad public interest of commitment to economic and employment growth (in the Katzenstein sense). Low corporate taxes are a core part of this export-led growth regime but as our case study suggests, it is the cluster effect of labor that drives sectoral expansion.

It is for this reason that we suggest that variance in national growth regimes and government enterprise policies, rather than the capacity of government to implement tough reforms and austerity, (Afonso, Zartaloudis, Papadopoulos 2015) explains the divergent recovery in the Euro periphery. Where Ireland made a decades-long commitment to investment-oriented enterprise policy, as a means for attracting multilateral investment and pursuing export-led growth, the remaining PIIGS have adopted significantly different growth paths, primarily built around domestic demand (Johnston and Regan 2015). Unlike export-led growth regimes, domestic demand-led models are supported by political coalitions in the domestic non-traded sector. Within the EMU, domestic demand-driven models cluster in Southern Europe's 'low-productivity', 'mixed market' economies. As noted by Brazys and Hardiman (2015) these 'Club Med' countries shared a strong and direct presence of the state in the economy, with significant public bureaucracies (Sotiropoulos 2004) and welfare structures (Rhodes 1996). These structural institutional features led these economies to expand rapidly as government borrowing costs came down following the creation of the Euro (Zemanek 2010). Whereas Ireland's export recovery was precipitated by enterprise policy aimed at attracting investment in emergent and high growth tech sectors, recovery (and aggregate demand more broadly) in these countries would be driven primarily by favourable interest rates for government borrowing, or an expansion of domestic consumption. This suggests that their national growth regimes (and the underlying domestic political coalitions supporting this) are qualitatively distinct from the *foreign owned* export sectors shaping the post-recessionary period of strong economic growth in Ireland.

To explain *divergent recovery* we consider it necessary to go beyond a simplistic analysis of market liberalisation (supply side structural reform) and unpack the politics of how export-led growth regimes are actually constituted, particularly in peripheral market economies lacking the domestic institutions associated with northern European manufacturing. To do this, and in line with the developmental state literature, we analyse the role of public sector enterprise policy, which is the latent independent variable in our study. Enterprise policy, however, unlike standardised indicators on 'ease of doing business' and/or 'product and labor market liberalization', (supply side structural reforms) is not an easy variable to measure. It is for this reason that we capture the latent effect of enterprise policy by examining the role of US QE in the aftermath of the Euro crisis. If Ireland's export recovery is shaped by the path dependent effect of state enterprise policy to attract investment from global US firms (immune from domestic austerity) then we would expect to observe an increase in foreign direct investment in Ireland in response to the monetary expansion of QE. This is particularly the case in light of recent evidence that suggests US QE is a crucial factor in explaining a venture tech-capital boom in the Silicon Valley[10]. In the section below we test this 'transmission' argument with a comparative panel analysis, and follow it with a within-case study analysis of Ireland's 'Silicon Docks', and the role of the public sector agency tasked with winning FDI: the IDA.

Divergent recovery in the PIIGS: Follow the Money.

The discussion above illustrates how the Irish economy was differentially situated from its peers on the European periphery, and deeply problematizes the assumption that export-growth was a causal outcome of austerity measures. This recognition forms the basis of our expectation for why Ireland has experienced such a dramatic divergence in its recovery from the 2008 financial crisis vis-à-vis its contemporaries. Due to its decades-long state-directed sectoral development strategy, Ireland was well primed to receive inflows of FDI, which facilitated its export-led recovery. The other PIIGS countries, which did not have

[10] See http://uk.businessinsider.com/evidence-that-tech-bubble-is-at-a-peak-2014-10?r=US&IR=T accessed 17-07-2015

these institutional structures in place, but instead relied on an economic model driven, to a large extent, by publically-financed domestic demand, have been unable to recover due to the continued constraints their governments face in securing external finance (see Johnston & Regan 2015 for an analysis of a divergence in *domestic demand* and *export oriented* growth regimes of the Euro).

In order to test the impact of our latent variable of interest, enterprise policy, we consider the relationship between FDI project announcements and the US Quantitative Easing (QE) program through a comparative analysis of Portugal, Italy, Ireland, Greece and Spain. The effects of the US QE programs on inward investment have been documented in a number of recent papers. Lim et al. (pp. 2) (Lim, Mohapatra et al. 2014) note how QE can increase FDI inflows through the three traditional 'transmission channels' of liquidity, portfolio balancing, and confidence, as well as through other, unobservable, QE effects. They note how the liquidity channel operates by improving the balance sheets of private banks, relaxing their liquidity constraints and enabling them to expand lending to their customers, including, most importantly for our analysis, private firms. They describe the portfolio balance channel as the QE effect of reducing the supply of privately-held risk assets which, in turn, increases demand for longer-duration assets, including FDI. Finally, they elaborate on how the confidence channel of QE is a signalling mechanism whereby the central bank is expressing a commitment to maintaining low interest rates in the mid-term, making large scale financing of investment a less risky proposition for firms (pp. 6-8)(Lim, Mohapatra et al. 2014). Their empirical findings support their expectations; although they find that FDI is less sensitive to QE, noting that it instead 'tends to respond to structural, long-term determinants' (pp. 26) (Lim, Mohapatra et al. 2014).

Using a similar approach, but focusing their analysis on temporal dummies for each of the three QE episodes, Park et al. (Park, Arief et al. 2014) find similar broad results for the impact of QE globally and on Asian countries, results echoed by Cho and Rhee (Cho and Rhee 2014). These authors, however, more explicitly consider the different episodes of QE, finding that the first tranche of QE had a *negative* impact, while third QE iteration had a

positive impact, on FDI. While they do not elaborate on this result, we argue that it is reasonable given the differences in assets purchased in each episode. Whereas the first QE efforts focused primarily on purchasing mortgage-backed securities from banks, the second and third phases focused instead on purchasing of Treasuries.

Schwartz (2015) discusses an additional financial impact of QE, arguing that QE (inadvertently) rebalanced the global economy by inflating the *non-traded* sectors, particularly housing, of non-US global trade surplus economies. While we certainly don't quibble with this logic, we do not think it is mutually incompatible for QE to have impacted both the tradable and non-tradable sectors, particularly via *venture capital funding*. QE flooded the market with excess liquidity and drove down returns in traditional financial assets. Accordingly, QE money searched for return elsewhere – perhaps in non-tradable sectors (particularly real estate) but also plausibly in FDI when there was a sufficient expected return to be had, particularly in those expanding firms clustering in high growth sectors of the economy, such as ICT.

While we are unaware of any research into the effects of QE on investment into Europe we find it plausible that the same logics will hold. The three transmission mechanisms essentially translate to the expected price of finance. By expanding the money supply, QE reduced financing costs for firms looking to invest (at home or abroad). The research cited above clearly documents how this action increased inflows into developing and Asian markets. However, it is entirely reasonable to assume that the mechanism would also induce increased FDI inflows into *any* market *that promised sufficient return.* While the commodities boom in the developing world and the high levels of Asian economic growth ensured that QE-fuelled financing would be able to find return across a broad swath of these countries, the stagnant economic conditions of Europe limited investment opportunities.

Our contention is that different growth regimes, shaped by varying levels of state-led developmental and enterprise policies among the PIIGS, make the constituent states more

or less attractive as FDI destinations. When the global financial system is hit with an (positive) exogenous credit shock, we would expect countries with effective enterprise policies to see a larger increase in the number of FDI projects coming into their country. The US QE program was just such a shock and, accordingly, our expectation is that because of Ireland's enterprise policy - coordinated by the peripheral public sector agency the IDA - Ireland will have seen a larger increase in the number of FDI projects in response to QE vis-à-vis the other PIIGS.

Hypothesis 1: The US QE program increased FDI projects to Ireland, but not Portugal, Italy, Greece or Spain.

Our investigation makes two significant adjustments from the literature above in order to improve the operationalization of our indicators and increase the frequency of our observations, improving our confidence in the temporal identification of QE program effects. First, with respect to our main independent variable, we focus on the monthly changes in the US Federal Reserve's Treasuries Holdings, which were expanded markedly under the QE programs.[11] While we do not explicitly model the transmission mechanisms, this approach allows a more direct measure of the magnitude of the QE impact, by providing an amount of monthly QE, rather than a simple temporal indicator as in (Park, Arief et al. 2014). We think that this is appropriate, as the linkage via the transmission mechanisms has been definitively shown in the papers above. Secondly, while the operationalizations of the transmission mechanisms in the papers above rely on metrics that are available on a quarterly basis, focusing on Fed holdings allows us to increase the temporal frequency to monthly observations. This is a significant boon as we are explicitly trying to determine the (differential) timing into and out of crisis for the 'PIIGS'.

[11] And in particular the 2nd and 3rd QE programs. The first QE program saw the US Federal Reserve focus on buying mortgage-backed securities, in particular subprime collateralized debt obligations (CDOs) from distressed financial institutions. We think that the causal logic for the 1st QE program translating into increased FDI is significantly weaker than that of the 2nd and 3rd, and indeed the studies cited above show a more substantial impact from these latter programs.

Differences that are observable in monthly data may be obscured when aggregating to the quarterly level.

Our second innovation is to focus our dependent variable on the *number* of FDI announcements rather than the *amount* of FDI as a component of Gross Financial Inflows (GFI) as the dependent variable. Again, we argue there are two advantages to this approach. Utilizing proprietary data from the Financial Times fDi markets database, we employ an actual count of monthly FDI projects into the five PIIGS countries.[12] As a verified count, this metric is far less susceptible to measurement error vis-à-vis the statistical estimates which are employed to generate FDI inflow data.[13] Beyond reducing our concerns with measurement error, this indicator also provides data with a monthly frequency, allowing for the more fine-grained temporal identification of the QE effect.

Our data consists of a panel of the monthly FDI announcements in each of the 'PIIGS' countries from January 2003 to December 2014. As our dependent variable is a left-censored count variable we employ negative binomial regression.[14] In the first instance (Model I), we run a baseline, non-panel model, that simply considers data from the Irish case in order to evidence a relationship between QE and Irish FDI announcements. We then add (Model II) a measure of the rate of change of wages in Ireland. If our contention is correct that it is enterprise policy, rather than austerity-induced wage competitiveness (internal devaluation), that attracts FDI, then we would expect to see no statistically significant relationship between this measure and the number of FDI projects. Finally, to uncover differences in how QE impacted FDI vis-à-vis Ireland and the remaining 'PIIGS' we use a technique similar to that employed in (Berthélemy and Tichit 2004) or (Brazys 2013). We first run an aggregate random-effects panel model investigating the overall effect of QE

[12] This data counts both 'Greenfield' and expansion FDI projects.
[13] The Financial Ties fDi data does not include actual investment amounts for all documented projects. However, for those projects that did have investment amounts the average per-project amount for each individual PIIGS country was well within one standard deviation of the average per-project amount for all the PIIGS countries. This leads us to believe that the verified *number* of projects is a reasonable proxy for the *amount* of FDI.
[14] Post-estimations tests from a Poisson regression suggest the data is over-dispersed and as such we use negative binomial (xtnbreg in Stata 13).

on FDI announcements in the PIIGS countries (Model II).[15] We then look for parameter differences for Ireland by estimating the full model again with the addition of all of the explanatory variables multiplied by an Ireland dummy variable (Model III). This technique allows us to assess the impact of the explanatory variables on Irish FDI announcements compared to the other 'PIIGS' countries.

We incorporate a number of control variables from (Lim, Mohapatra et al. 2014).[16] We expect larger economies to have more FDI projects. Likewise, higher GDP growth rates and higher risk premiums on corporate bonds increase the attractiveness of FDI projects and should increase FDI project numbers.[17] Based on findings from (Brazys and Hardiman 2015) that increased media usage of the 'PIIGS' term caused financial markets to treat those countries more similarly, we include their count variable of PIIGS usage, expecting a negative correlation with FDI projects. Finally, we also include the monthly average of the USD/EURO exchange rate, expecting a higher number of FDI project announcements when the dollar is strong. Data sources and summary statistics are available in Appendix I.

[15] We use a random-effects model as a Hausman test fails to reject the null, although our results below are robust to country-level fixed effects, results which are not presented but available upon request from the authors. The fixed-effects model would include all other unobservable country-specific factors (such as corporate tax rate).

[16] We lag all control variables by one month to account for the delay in firms processing economic information and making FDI decisions. We do not lag the difference in Fed Treasury holdings as the timing of these bond buying programs were well publicized thus presumably known to firm decision makers. We lag these differences as a robustness check (results available from authors upon request) and find no difference in our substantive findings.

[17] Where we use a standard measure for risk premiums, the spread between Baa corporate bonds and the 10-year constant maturity US Treasury.

Table 1: FDI Projects and QE

Variable	Model I (Ireland)	Model II (Ireland with wages)	Model III (PIIGS)	Model IV (PIIGS / Ireland Comparison)
QE_Δ	0.0022** (2.75)	0.0022** (2.75)	-0.0000 (0.06)	-0.0007 (1.34)
PIIGS	0.0008† (1.85)	0.0008† (1.84)	-0.0001 (0.40)	-0.0004 (1.46)
GDP	-0.0193† (1.66)	-0.0194† (1.66)	0.0018** (2.80)	0.0030** (4.49)
GDP_%Δ	0.0089 (1.09)	0.0090 (1.09)	-0.0021 (0.67)	0.0083** (2.80)
RISK	0.0398 (1.03)	0.0400 (1.03)	0.0473* (2.36)	0.0514* (2.30)
USD/EUR	1.2834** (2.87)	1.2885** (3.03)	1.0508** (5.48)	0.8216** (4.05)
Wages_Δ		0.0001 (0.07)		
QE_Δ*Ireland				0.0030** (3.14)
PIIGS*Ireland				0.0011* (2.31)
GDP*Ireland				-0.0107 (0.93)
GDP_%Δ*Ireland				0.0095 (1.08)
RISK*Ireland				0.0077 (1.08)
USD/EUR*Ireland				0.8768* (2.16)
Constant	1.6143** (2.87)	1.6092** (2.84)	0.2918 (1.10)	0.2602 (0.97)
N	138	138	676	676
χ^2	32.56	32.55	64.15	113.30
Prob > χ^2	0.0000	0.0000	0.0000	0.0000

Absolute value of *z* score in parentheses. ** Significant at 1% level, * Significant at 5% level, † Significant at 10% level.

The findings in table one provides substantial support for our hypothesis. Examining the Irish data alone we see a positive and statistically significant relationship between changes in QE and the number of FDI projects in Ireland. Negative binomial regression gives the

change in the expected log count of the dependent variable for a one-unit change in the independent variable. Accordingly, an increase of one-billion dollars in the monthly change of Fed held Treasuries is associated with an increase of 0.0022 in the log count of Irish FDI projects. The Fed increased its Treasury holdings by over 2 trillion dollars over the duration of QE, resulting in an additional 81 FDI project in Ireland over the same time period. This result is magnified considerably in the panel comparison model (IV) where the coefficient for changes in QE on FDI projects for Ireland is positively and significantly different from the remaining PIIGS, suggesting that *over the life of the programme, QE contributed to 300 more FDI projects in Ireland vis-à-vis the other PIIGS*. We take these findings as significant evidence that the US QE program had a significant and differential impact on the number of FDI projects in Ireland compared to the remaining PIIGS countries. The results in Model II also support our contention that it was the state-led enterprise policies (vis-à-vis QE) and *not* changes in wages that led to increased FDI projects in Ireland, as the coefficient on wage changes is positively signed and highly insignificant.[18]

The results on the control variables increase our overall confidence in the model. The Dollar/Euro exchange rate is statistically significant in the expected direction in all models. While GDP, the GDP growth rate, and the risk measure are insignificant in the Ireland-only model, GDP and the risk measure are both significant in the expected direction in the aggregate model. We think the non-findings on these controls in the Irish model are entirely consistent with our empirical puzzle and theoretical explanation – Ireland was categorized as one of the PIIGS countries in crisis (as evidenced by high bond yields and a shrinking economy) and yet attracted a large number of FDI projects that led to its recovery. Clearly the 'conventional wisdom' on FDI determinants did **not** hold in Ireland but, rather, something else (the innovation cluster of Ireland's state-led development strategy) attracted FDI to Ireland. On the one hand, this is related to low corporate taxes

[18] This non-finding is robust to a number of different formulations of the change in wage variable. We also found no significant bivariate relationship between wages and the number of FDI projects or between wages and QE.

but on the other, as illustrated in the case study below, it is the consequence of a cluster effect associated with an expanding 'innovative sector'.

The sole anomalous results from the controls is the evidence that use of the 'PIIGS' term had a *positive* impact of FDI projects into Ireland whilst having, if anything, the expected *negative* impact on the remaining PIIGS countries. Our initial reaction to this finding is that it perhaps points to the different cognitions in the logics driving short term 'portfolio' investment, where fortunes can be won and lost in seconds (Easley, Lopez de Prado et al. 2011), compared to the widely-understood long-term planning and decision making behind FDI (Popper, Perez-Quiros et al. 1996). Whereas the former (financial markets) might be more vulnerable to heuristics and mental short cuts in decision-making (Brazys and Hardiman 2015), the latter (FDI investors) is likely to be based on a more considered analysis that is less-easily swayed by herd behaviour.

In sum, our statistical findings show a strong relationship between the US QE program and increased levels of FDI projects in Ireland vis-à-vis its 'PIIGS' counterparts. The logic behind this result is that, like elsewhere in the world, QE reduced financing costs and increased the relative return on non-paper assets, prompting investors to seek out return elsewhere. Our argument is that Ireland was the beneficiary of this search not because it ardently followed austerity policies to increase its market competitiveness but because it had long been engaged in a state-led enterprise policy that put the institutions in place to attract this investment – a policy that was not diminished, and perhaps enhanced, by the 2008 financial crisis. The other PIIGS failed as beacons for FDI not because they lacked the former (they did not) but because they had not invested sufficiently in the latter. While our statistical findings are consistent with this interpretation, we next turn to a within-case study analysis to flesh out the causal pathway on the role of enterprise policy, and the role of developmental state agents in attracting investment from US firms. Whilst pharmaceuticals are the largest export from Ireland, it is the expansion of ICT computer services that distinguishes the pattern of export-led recovery since 2008. For this reason

we focus on the rise of Ireland as a European tech hub and the '*Google effect*' in the case study.

Fáilte Ireland: Enterprise Policy and the Rise of Ireland as a European Tech Hub

In the Irish case, the role of the state in developing high-tech industries, or innovation clusters, occurred in three distinct waves (Interviewee (3), see Worrall 2015a, 2015b). Each wave begins with the IDA luring a large global US firm to set up their operations in Ireland, which, we argue, subsequently generates a clustering labor market effect for additional FDI from firms trading in the same sector[19]. The *first wave* started in 1989 when the IDA secured inward investment from INTEL to establish their European micro-processing plant in Ireland (White 2000a). The state development agency sourced the location for INTEL's proposed plant and actively recruited 300 hundred skilled engineers from California and elsewhere to return to Ireland to work for the company (White 2000a, confirmed in interview with IDA board executive). This was a critical juncture in Ireland's path toward developing an export-led growth regime in the electronics and subsequently internet-tech sectors. In 2015 INTEL employed over 4,500 employees and had invested over 12.2 billion into their Irish operations. IBM, Apple, Dell and other hardware manufacturers also established and expanded during this emergent period of Ireland's ICT-oriented growth. Employment in the sector doubled during the 1980s with Apple, in particular, employing over 4,000 people by 2014 (Newenham 2015; MacSharry et al 2000).

Trouble began to brew in the 1990s when many ICT firms began to move their manufacturing operations outside Ireland to low-wage, low-cost economies, particularly in Eastern Europe. This led to an intentional shift in strategy by the IDA (see White 2000b and 2000c). Policymakers recognized that in a context of global market competition and European integration, Ireland was not likely to compete on the basis of wage competitiveness. Rather than target hardware ICT manufacturing firms, the IDA opted to

[19] Annual reports on FDI from IDA supported firms can be found here: http://www.idaireland.com/about-ida/annual-reports/ and the IDA's take on its own history here: http://www.idaireland.com/about-ida/history/

target emergent global *software development* companies (White 2000c). This led to the *second wave* of inward investment from ICT companies in the electronics sector (Worrall 2015). By the early 2000s Ireland was the second largest exporter of software in the world (Barry & Egeraat 2008). This expansion in investment primarily came from IDA client firms seeking to expand and transform their existing operations, such as Microsoft. Subsequently the IDA began to target Silicon Valley, luring new California-based software companies such as Oracle, AOL and the world's first Internet browser, Netscape (Newenham 2015). Whilst some of these firms were unsuccessful, they left a cluster of experienced labor, and in particular; a new generation of Irish managers with US corporate experience, which attracted new firms seeking to invest in Ireland (interviewee 2/3).

The dot-com crash in the early 2000s negatively affected IT investment in Ireland (and is one of the factors that encouraged government to expand domestic consumption to maintain employment growth). But the tech sector took off again from 2004 with the arrival of '*born on the internet*' companies[20] (Burke 2015). It is this *third wave* of FDI, associated with an influx of investment from Internet services companies, which is central to explaining Ireland's economic recovery from 2009 onwards. The critical juncture can be traced to Google's decision to establish their European HQ in Dublin in 2004, which was followed by Facebook in 2008[21]. This 'Google effect' was equivalent to the 'INTEL effect' in that it '*promoted Ireland into the Premier league of tech investment*' (interviewee 2). Google employed less than 50 employees when they established their operations in Ireland[22], but 2009 to 2014 they expanded and it is now estimated that they have 2,500 employees[23]. The arrival of Google was a direct outcome of a five-year campaign by the IDA to secure their investment, ahead of Switzerland (interviewees 5-9). Based on the IDA's previous experience of luring INTEL, their strategy was aimed at ensuring Google established a data

[20] For detailed press releases on internet firms investing in Ireland, see IDA press releases for the digital sector here: http://www.idaireland.com/business-in-ireland/industry-sectors/internet/
[21] See http://www.irishtimes.com/business/technology/a-seismic-shift-for-dublin-how-google-was-persuaded-to-set-up-shop-in-ireland-1.2074137
[22] See IDA case study on Google Ireland: http://www.idaireland.com/how-we-help/case-studies/google/
[23] See Silicon Republic webpage for more information: https://www.siliconrepublic.com/careers/2015/05/13/record-number-of-jobs-available-ireland

analytic centre, which would sink their costs and embed their presence in the economy. The presence of Google, it was argued, would facilitate a new wave of additional sectoral investment from a whole host of companies in receipt of venture capital funding, seeking to cluster around the Internet giant (interview with IDA executive).

This has proven to be correct. During the period of the Euro-inspired fiscal adjustment (2009-2014) the following global Internet companies have set up operations in Ireland: Zynga, Twitter, DropBox, LinkedIn, Hubspot, Trip Advisor, AirBnB, Square Space and Engine Yard, to name but a few (130 companies are listed in Appendix III)[24]. Within the space of ten years, and despite being priced out of international financial markets, the Irish public sector, led by the IDA, has managed to secure sufficient investment to turn Dublin into a European tech hub for global Internet companies. These Internet service companies are located in the high-wage sectors of the economy, actively recruit their employees from across the EU, and were one of the few sectors that *increased* wages during the recession[25]. As argued in section (2) the core sectors driving the post-crisis export-led recovery in the Irish case are internationally traded business services. The dominant sectors within this, particularly since 2011, are computer services (a relatively new indicator that has been developed in the central statistics office). It is therefore reasonable to assume that the correlation between QE in the USA and inward FDI to Ireland, since 2008, is directly related to the rapid growth of these ICT sectors, which expanded during the same time period of Troika inspired austerity, and the collapse in domestic consumption[26].

The IDA: Global Firms and State Engineering of the Silicon Docks

The state development agency, the IDA, was crucial in securing inward investment from the 130 tech firms listed in the appendix, and it is the presence of these global firms that has

[24] For an exhaustive list see: http://makeitinireland.com/tech-map/
[25] See http://www.irishtimes.com/business/economy/it-workers-skip-recession-as-wages-jump-10-since-2009-1.1929473
[26] It is important to note that the IDA considers manufacturing a core priority, particularly outside Dublin because it creates a 'volume effect' i.e. more jobs. Cost competitiveness matters a lot in these low-skill firms.

kick-started the third wave of tech investment during the 2008-2014 period. The IDA strategy is to actively nurture emergent companies with high-growth potential, via their California-based offices, long before they become publicly IPO listed. The IDA, unlike Enterprise Ireland (the development agency tasked with supporting indigenous Irish firms) does not have Venture Capital funding to directly invest in emerging companies. Rather they use non-market forms of coordination to network with firms in receipt of venture capital funding, and have a close relationship with many small Irish firms in receipt of VC from California based funders, such as Polaris Partners and Silicon Bank[27]. Nurturing born on the Internet firms, in receipt of venture capital funding, was precisely the strategy pursued by the IDA when they secured investment from Facebook. They were not a multi-billion IPO firm when they invested in Ireland (and thereby there was not an immediate corporate tax windfall to be gained for the state) but they were considered worth 'betting on', given that they were in receipt of such huge sums of venture capital funding.

Ireland's low corporate tax regime is obviously an important incentive in how the IDA strikes political deals to lure investment from their clients, and most MNCs specify corporate tax as a determinant of their investment decision, particularly those large firms who start a cluster effect in their specific sector[28]. There is no shortage of critical commentary as to whether this 'low tax strategy' aimed at luring investment can be considered a government subsidy to industry, thereby breaking EU competition law[29]. Despite this, almost all the companies and the IDA in particular, specify that 'talent' matters more than 'tax' in their medium to long-term investment decisions (interviewee 1). We suggest that what the IDA call 'talent' is a colloquial term to refer to the pool of labor that becomes available, over time, within an expanding 'innovative sector'[30]. Although rarely

[27] See https://www.siliconrepublic.com/start-ups/2013/09/17/ida-says-working-with-venture-capital-community-is-key and http://www.idaireland.com/newsroom/ida-ireland-to-develop-fu/
[28] See ICT Ireland and the Irish Business and Employers Confederation http://www.ictireland.ie/Sectors/ICT/ICT.nsf/vPages/Papers_and_Sector_Data~the-global-technology-hub/$file/The+Global+Technology+Hub+ICT+Ireland+ISA.pdf
[29] See Jim Stewart (2011) http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.360.6500&rep=rep1&type=pdf
[30] See the IDA's own take on their strategy: http://www.idaireland.com/en/how-we-help/resources/infographics/fdi-value-proposition/index.xml

described in such terms, it effectively refers to the human capital externalities that emerge from thick labor markets and innovation clusters. In the US-Irish tech sectors this means a European wide, multilingual, customer service oriented work force with direct experience of working in the target-oriented and flexible corporate culture of US multinationals. In internationally traded services it rarely, if ever, refers to the ability of MNC firms to compete on the basis of wage costs. On the contrary, it refers to the ability of these firms to attract a university-educated workforce with high-wages, lucrative stock options, social insurance and favourable working conditions, traditionally associated with unionised companies[31].

It is generally estimated that two-thirds of tech employees in the 'Silicon Docks' have been recruited from across the EU, and that the IDA were central in facilitating this recruitment drive, in addition to sourcing local financing for purchasing commercial property [32]. What the IDA offers, in effect, is a ready-made business model for their FDI clients, which enables new firms to overcome the various logistical problems they face when setting up their operations: sourcing labor, finance, office space, and understanding regulations. Unpacking the precise nature of the tech labor market and how it has shaped a whole raft of Internet companies to establish their operations in Ireland is beyond the scope of this paper. But it is important to note that unlike Silicon Valley, these firms do not engineer their core software products in Ireland, and R&D is minimal. Core jobs include multilingual editing, data analytics, marketing, sales and customer support services. It is informally acknowledged that what is required to work in the Internet tech sector is third level university education, communication skills, the cultural exposure of living in more than one country, and multi-linguistic proficiency (interviewees 14/15). It is the latter requirement that locks-out many Irish graduates from working in this sector, and a core challenge identified by the IDA is under-investment in third level education.

[31] See Newenham (2015) http://www.irishtimes.com/business/making-ireland-more-attractive-for-talented-overseas-workers-1.1957949

[32] These tech companies do not release precise information. See http://www.independent.ie/irish-news/thousands-of-foreign-workers-arriving-to-fill-hitech-jobs-29261405.html and http://www.irishtimes.com/business/making-ireland-more-attractive-for-talented-overseas-workers-1.1957949

The development of Ireland's export-growth regime, engineered by an activist industrial policy and global tech firms, has subsequently led to the emergence of a strong start-up scene with new accelerators and incubator programs clustering at the outskirts of the high-priced commercial offices in Silicon Docks (Connolly 2015, O'Riain 2014). Over 100 new start-ups have emerged since 2008 (interviewee 1). This indigenous software sector is directly supported by both state and private venture capital funding, such as the local state-sponsored development agencies: National Digital Research Centre (NDRC) set up in 2009, and Enterprise Ireland. For economic sociologists and developmental state scholars, it is these micro-firms and their supply-side networks that are the crucial component of Ireland's underdeveloped national system of innovation. It is our argument that the indigenous tech scene, whilst important, is a spin-off effect from the presence of *global Internet firms*, and that the core actor shaping the market is the peripheral FDI-oriented economic development agency: the IDA.

The expansion of investment into the US-Irish tech sector from 2009 onwards, we suggest, is a fusion of financing made available by US QE and the path dependent effect of a state-led enterprise policy. Timing, in this regard, was crucial (Pierson 2004). The fact that two Internet global giants, Google and Facebook, were already based in Dublin, and had a hugely expansive workforce, meant that the IDA was well placed to steer additional ICT investment into Ireland. To give a qualitative sense of what the IDA were doing during this specific period (whereby Ireland's reputation had been shot due to the financial market moniker PIIGS), the IDA dedicated almost three quarters of their annual budget to marketing, and launched a massive advertising campaign in the USA. This strategy was specifically targeted at tech investors and included infamous slogans such as '*Facebook found a place for people who think a certain way: it is called Ireland*', and '*Google searched the planet for a place to do business: they choose Ireland*' (cited in Newenham 2015, p57).

The state was using the presence of global firms, and their local labor markets, to lure other US-based firms seeking to expand their European operations in Ireland[33].

The core point is that Ireland's export recovery was engineered by an activist enterprise policy by developmental state agents building a close non-market relationship with US firms. These firms were almost entirely immune to the internal adjustment and compression in domestic demand associated with the Troika austerity program. Unit labor costs in Ireland have been reduced, and the real exchange rate improved, but this is primarily because of a contraction in the labor-intensive and non-traded domestic sectors of the economy, primarily construction (McDonnell & O'Farrell 2015). The expansion in external demand, driven by export-led growth in internationally traded services, has occurred in the US multinational sectors, whose strategies are shaped by the US business cycle. Whilst US investment is favourable to Ireland's 'liberal market economy' (LME), it is our argument that it would not have occurred without the direct intervention of an activist state-led enterprise policy. However, this is not necessarily a celebration of Ireland's developmental model. One of the biggest tradeoffs in prioritizing FDI is a lack of priority accorded to the indigenous enterprise sectors. Furthermore, the active use of low corporate taxes, as a constitutive component of enterprise policy, poses serious normative and distributional problems that are beyond the scope of this paper. But it is worth noting that this strategy is not likely to be sustainable in the context of increasing European integration.

Discussion

The Eurozone adjustment in the PIIGS countries is premised on the manufacturing model of cost competitiveness, and Ireland's economic recovery is regularly cited as a successful example of this. Our analysis shows that this policy prescription is fundamentally misplaced. Not only does the trilogy of fiscal adjustment, wage competitiveness and

[33] If there was an improvement in cost competitiveness during this period it was related to cheaper commercial property, a trend that has since gone into reverse in Dublin.

structural reform negatively impact countries with historically embedded growth models built around domestic consumption, it is *highly unlikely to generate the type of export led growth that has shaped Irish economic performance*. Ireland's high-wage, high-productivity internationally traded ICT services are price insensitive, particularly to labor costs, and compete in international markets that do not look like the traditional manufacturing model underpinning the design of the Troika macroeconomic adjustment. It is important, therefore, to call the Irish recovery what it is: a state-led development strategy, coordinated by an autonomous public sector agent, specifically tasked (and adequately resourced) to attract investment from global firms in an internationally liberalized market. This deeply embedded and path dependent enterprise policy is not easily replicable, and demand-led political economies in southern Europe are just as unlikely to converge with the Irish model, as they are unlikely to converge with the German model. But it does suggest that a developmental state strategy, however conceived, is necessary to overcome their peripheral market status.

On the one hand, our study supports the core hypothesis of the varieties of capitalism (VoC) theory, namely that liberal market economies are better placed to develop comparative advantage in high-risk innovative tech sectors, given the highly flexible nature of their labor markets, and a focus on general university education, as opposed to skill-specific vocational training. It is therefore unsurprising that a core component of the Troika adjustment is the attempt to liberalize product and labor markets through supply-side structural reforms in the rest of the PIIGS countries. But what both the VoC and Troika perspectives ignore is the relationship between supply-side reforms and macroeconomic *growth regimes*. The liberalization of product and labor markets in peripheral economies is not likely to generate an export-led growth regime in the absence of a developmental activist state. Our research suggests that Ireland's export growth regime, and its capacity to attract FDI in liquid US markets after the QE program, can be traced to *enterprise policy*, rather than market liberalisation per se. Furthermore, it shows that when a public sector agent is *autonomous from the civil service* and empowered to develop high-tech industries (admittedly, in the Irish case, through attracting global US corporations with low taxes), it

does not necessarily imply clientalistic rent seeking (even if some argue that the IDA has been captured by the interests of the FDI sectors).

The extent to which the other crisis afflicted PIIGS countries can carve out an autonomous growth regime through a state-led developmental enterprise policy aimed at export-led growth, without falling prey to regulatory capture, seems to us to be a crucial and underexplored part of the debate in contemporary comparative political economy today. Fiscal austerity had little, if any, direct effect on Ireland's export-led recovery from the Eurozone crisis, and this is perhaps the most important policy implication of our research. This is not to suggest that the indirect effect of government stability is unimportant. Economic certainty (particularly on the corporate tax rate) and parliamentary stability has helped the IDA convince investors that Ireland is worth betting on (interview with IDA). The long-term effect of 'austerity', however, is likely to be counter-productive to Ireland's FDI strategy. Fiscal austerity in Ireland has meant under-investment in public infrastructure: housing, broadband, childcare and education in particular. Most of the tech firms shaping Ireland's post-crisis growth regime identify *labor supply* as the most important factor in their investment decisions. This requires a competitive third level education system; capable of producing high quality graduates with IT, analytical, interpersonal, communication and language skills. Since 2009 funding per student in the third level sector has declined by over 22%. It is naïve in the extreme to think that this won't affect the quality of education, and is perhaps the biggest public policy challenge facing Ireland's development model.

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Appendix I: Data sources and summary statistics

Table I.1 Data Sources and Summary Statistics

Variable	Source	Mean (SD)	Min	Max	N=
FDI Projects	Financial Times fDi Intelligence Database http://www.fdiintelligence.com/ (Number of projects per month)	13.49 (11.98)	1	68	705
QE	http://research.stlouisfed.org/fred2 (Monthly holdings in billions of current USD)	1092.31 (597.90)	474.68	2500.00	720
PIIGS	Brazys and Hardiman 2015 (Number per month)	34.60 (68.93)	0	447	720
GDP	http://data.worldbank.org/data-catalog/world-development-indicators (Quarterly, billions of current USD)	156.52 (143.53)	34.64	430.82	720
GDP_%Δ	http://data.worldbank.org/data-catalog/world-development-indicators (Authors' calcuations, quarterly)	0.72 (5.94)	-14.31	12.24	705
RISK	http://research.stlouisfed.org/fred2 (Spread between Moody's Seasoned Baa Corporate Bond and 10-year Treasury Constant Maturiy)	2.65 (0.87)	1.56	6.01	720
USD/EUR	http://stats.oecd.org/ (Monthly average, USD per Euro)	1.31 (0.10)	1.06	1.58	720
Wages_Δ	http://www.cso.ie (Change in monthly average of wages NACE codes M and J in current Euros).	2.40 (20.69)	-53.66	53.12	141

Appendix II: List of Interviewees

1. Director of Planning, IDA
2. Retired chief executive IDA
3. Retired chief executive IDA
4. Retired chief executive IDA
5. Board member IDA
6. Board member IDA
7. Secretary board IDA
8. Vice President IDA, California
9. Vice President, IDA, California
10. Junior Minister, Department of Jobs, Enterprise & Innovation
11. Principal Officer, Department of Jobs, Enterprise & Innovation
12. General secretary, Department of Expenditure & Reform
13. European Commission Representative, Ireland
14. IBEC official
15. IBEC researcher
16. ICTU researcher

Appendix III: 130 tech-oriented firms based in Ireland (name and year of investment)

Firm	Investment Year
HP	1971
Analong Devices	1977
Apple	1980
IBM	1981
Microsoft	1985
Oracle	1987
Intel/Altera	1989
Dell	1991
Symantec	1991
Novell	1995
Xerox	1998
BMC	2001
Skillsoft	2002
SAP	2003
Amazon	2004
Google	2004
McAfee	2004
Paypal	2004
ebay	2004
Qlogic	2005
Xilinx	2005
Netgear	2006
Sandisk	2006
Vmware	2006
Cisco	2007

Citrix Systems Ireland	2007
Commscope	2007
Synopsys	2008
Workday	2008
Accenture	2009
Bently Software	2009
Facebook/Instagram	2009
Maxim Integrated Products	2009
Trend Micro	2009
LinkedIn	2010
Riotgames	2010
SalesForce	2010
Seagate	2010
Webroot	2010
EA	2010
EngineYard	2011
Guidewire	2011
Teradata	2011
Twitter	2011
Zynga	2011
Pinger	2011
Marketo	2011
Gilt	2011
Quest	2011
Capita Managed IT Solutions	2012
Dropbox	2012
Indeed.com	2012
Innovative Interfaces	2012

LogMeIn	2012
Nimble Apps	2012
Yapstone	2012
Ancestry.com	2012
Total Defense	2012
Adroll	2013
Airbnb	2013
Cadence	2013
Datahug	2013
Etsy	2013
Hubspot	2013
LexisNexis	2013
Qualtrics	2013
Soundwave	2013
squarespace	2013
10gen	2013
MongoDB	2013
Qualcomm	2013
Adara	2013
Mandiant	2013
FireEye	2013
TripAdvisor	2013
Overstock.com	2013
Marin Software	2013
Zendesk	2013
Calypso Technology	2014
Groupon	2014
Itron Inc	2014

New Relic	2014
SmartBear	2014
Storyful	2014
SurveyMonkey	2014
SWG, Inc	2014
Tintri	2014
VCE	2014
Yelp	2014
Artisan Infrastructure	2015
Coupa	2015
Data Clarity	2015
Docusign	2015
Ellucian	2015
Malwarebytes	2015
NuoDB	2015
Slack	2015
Stryker	2015
Uber	2015
Wrike	2015
Yahoo!	2015