An economic strategy for Wales?

March 2015

iwa

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The main project report will be published in autumn 2015.

Contents

Executive Summary

Ambitions to close the wealth gap between Wales and England will remain elusive unless Ministers set out an ambitious plan for economic growth backed up by actions.

Since powers for economic development were passed to the Welsh Government and Assembly in 1999 performance has been stable. However, the expectations of devolution creating an 'economic powerhouse' have not been realised. In 1999 the value of goods and services produced in Wales - the Gross Value Added or GVA figure - stood at 72.4% of the UK average. But by 2013 it was essentially unchanged at 72.2%.

Previous targets for closing the wealth gap between Wales and England to 90% of UK GDP per head were quietly dropped and not replaced with any clear ambitions. Indeed, growth policies of successive Welsh governments up to now have been on a scale implying acceptance of only modest narrowing of the gap with the rest of the UK, and have sometimes fallen down in implementation owing to a lack of commercial nous.

Missed opportunities have also stopped the Welsh economy getting more out of its larger businesses, and a lack of medium-sized firms in Wales producing branded goods to provide a competitive niche has also limited opportunities for growth.

It is time for the country to take a clear-eyed look at how ambitious it wants to be for its economic future and what sort of changes would be required to achieve its ambitions. There is no point espousing unrealistic targets and no point in specifying any target whatsoever without a strategy that might achieve it.

For the Welsh economy to be on par with England's, Wales needs a growth rate which matches that of Eastern Europe in the post-Soviet era. True catch-up growth means the economy needs to add nearly £1½ billion of activity, more than the turnover of an Admiral, every year. That is not going to happen under the current strategy and a marked shift in approach is needed to have any chance of it.

As examples of the investment needed to narrow the wealth gap the IWA suggests:

— Implementation of City Region projects with full roll-out of south Wales 'Metro' project.

— Challenging investment targets for Research and Development need to be set and much more needs to be done to encourage companies to invest in R&D in Wales.

— New build housing: an investment of approximately £500 - £750 million over and above existing programmes could enable an additional 10,000 affordable homes to be built.

- Housing retrofit: doubling existing investment in improving energy efficiency of homes to £250 million over the next Assembly term would support nearly 9,000 jobs.
- Large scale programme of multiple low carbon and energy savings projects to make Wales 'renewable energy' self-sufficient.
- Firms should be encouraged to develop more linkages to the local economy through their supplier choices and bringing more of their own activities to Wales.
- A "succession fund" to keep businesses in Wales by enabling owner managers to get retirement money out without selling the business or by facilitating management buyouts.

The IWA believes Wales can do better, and its time for all parties to get behind an ambitious long-term to grow the economy sustainably and spread prosperity.

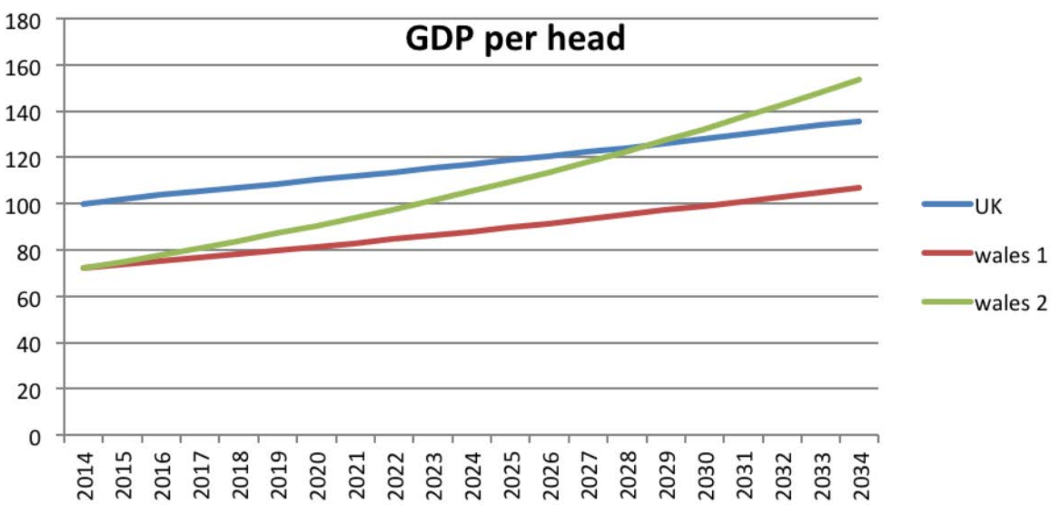
Introduction:

a reality check

Introduction: a reality check

GDP is not the be-all and end-all when we come to measure welfare and indeed it omits many of the things that make life worth living. Yet it is a reasonable indicator of commercial success with a fair to good correlation with the other good things of life. As Sophie Tucker put it: "I've been rich and I've been poor. Believe me, honey, rich is better."

Wales was at at 72.2 per cent of UK GVA per head in 2013-14, the latest available figure[1]. When the Assembly first took over responsibility of economic development the Welsh Government set a target of increasing that to 90%. In fact the ratio has not changed since 1999 and talk of changing it has disappeared from political discussion. Yet there is an undercurrent of grumbling in Welsh public life about the relatively poor economy, as if there is an expectation that the government should do something about it. Rather than vague grumbling or vaguer aspirations, surely it is time for the country to take a clear-eyed look at how ambitious it wants to be for its economic future and what sort of changes would be required to achieve its ambitions.



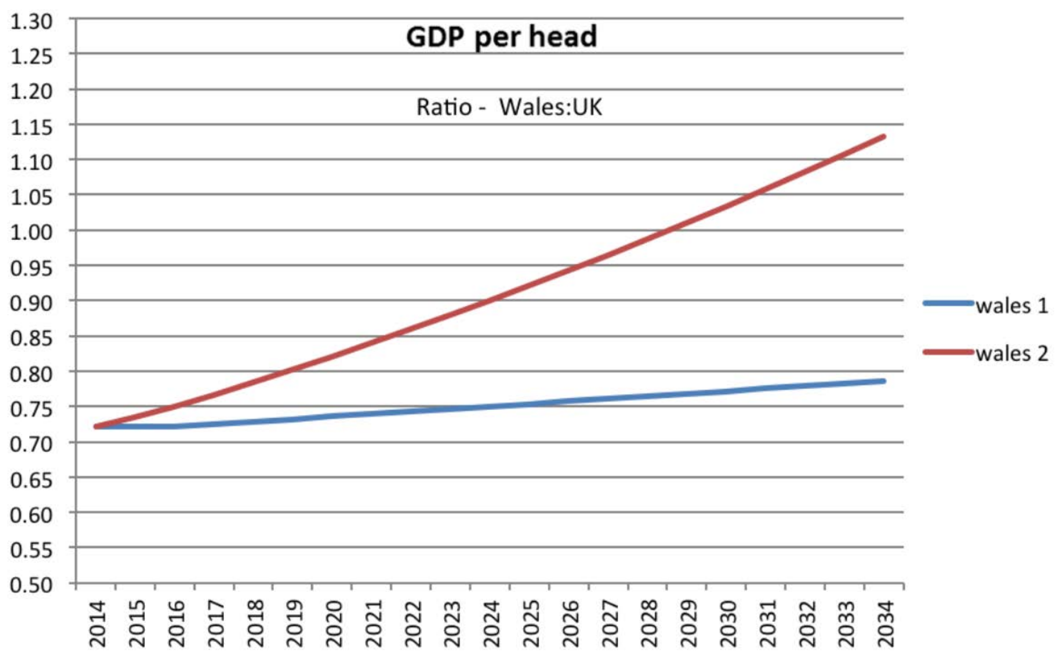
Let us ask, for example, what would it take for Wales' GVA per head to increase to 75 per cent of the UK average over the next ten years? The growth rate required would obviously depend on what growth the UK as a whole was achieving. Let us suppose that the UK growth per head was 2 per cent for the next two years then just 1 ½ per cent thereafter. Wales would need to sustain growth of 2 per cent in GDP per head to get to 75 per cent in 2025. If it continued to maintain that growth it would be at 79 per cent of the UK average in twenty years time in 2035 (wales 1). There is no reason to think that could not be achieved. As the review of recent history showed, the North-East of England has increased its relative GDP per head by something similar over the past ten years, starting from a position not much better than that of Wales. However Wales would remain a relatively poor country by UK standards, some 20 per cent poorer than average.

What would it take to reach the long-forgotten target of 90 per cent of UK GDP per head in ten years? The answer is an economic miracle of the kind that countries like France and Italy achieved after World War Two. On the same assumptions about UK growth, Wales would have to increase GDP per head by 4 per cent a year. If the population grows at a fraction of a per cent a year, that would see real growth of GDP near a sustained 4 ½ per cent, historically unprecedented in the UK. If such growth were sustained for 20 years, Wales would surpass the UK level of income per head in 2029 and by 2013 would be 13 per cent above the UK level (wales 2).

Another target some in Wales might wish to adopt is to achieve budgetary self-sufficiency. Currently Wales raises taxes of some £19 billion on a GVA of about £52 billion[2], a tax ratio of some 36 ½ per cent. Suppose that public expenditure grows at the same rate as in the UK as a whole and that matches the growth of GDP. Taxes generally grow about as fast as GDP or can grow a little faster as growth moves income-tax payers into higher tax brackets. We suppose tax revenues grow 1.005 times GDP growth.

On those assumptions, 2 per cent growth of income per head and an assumed growth of the labour force of 0.2 per cent would mean the Welsh deficit would go from 23 per cent of GVA in 2014 to 21 per cent in 2024 and to 19 per cent in 2034 (wales 1). Wales would still be heavily dependent on English subsidy and far from paying its own way in two decades' time.

On the economic miracle path with GDP per head growing at 4 per cent, labour force growth would surely be faster too as immigration would be encouraged. Suppose it went from 0.2 to 0.3 per cent. By 2034 GDP would be 47 per cent higher than on the 2 per cent path. In ten years time the deficit would be halved to 11 per cent and in 2034 it would be 1 per cent (wales 2). It demonstrates the extreme fragility of Wales' finances that even supposing an economic miracle and sustained growth above 4 per cent, it would take a good 20 years for the nation to be able to pay its own way while maintaining UK levels of public service.



There is no point in espousing unrealistic targets and no point in specifying any target whatever without a strategy that might achieve it. It is clear though that to approach UK average levels of income per head and to be less reliant on subsidy, Wales needs an acceleration in growth, beyond anything currently contemplated and which on current economic policies is beyond reach. True catch-up growth means the economy needs to add nearly £1½ billion of activity, more than the turnover of an Admiral, every year.

Such an extraordinary acceleration may well be simply unachievable. It is only even conceivable because the Welsh economy is so small but even so it could not be achieved without a huge increase in investment of various kinds. That in turn requires taking risks because investments may not pay off to the extent hoped or expected. It also requires sacrifices. Money spent on investment cannot be spent on goods and services – including public services – in the here and now. Even if financed by borrowing, the investment would require debts to be serviced in the near future at the expense of other sorts of spending.

Devolution gives the country a chance to debate what sort of future it wants and what sort of risks it is prepared to run. These are questions that will not necessarily sit within the framework of party-political discussion.

The growth policies of Welsh governments up to now have sometimes fallen down in implementation owing to a lack of commercial nous but they have also generally been on a scale implying acceptance of only modest narrowing of the gap with the rest of the UK. Plaid Cymru has occasionally sounded a more ambitious note, consistent with its aspiration to eventual Welsh independence, but has not proposed policies likely to generate the catch-up growth that would be required to meet their ambitions over a timescale of two to three decades.

An outsider observing our economic policies and the national debate, such as it is, would conclude the Welsh were either content with their relative position or did not believe there was anything to be done about it.

Now, after 15 years of Welsh democracy, perhaps it is time to test that conclusion and have a discussion about our current relative economic situation. Are we resigned to it? Can we judge what is, or is not, possible in the way of improvement? Can we then find policies appropriate to our objectives?

Notes

1 Table 2.3, NUTS2 Tables, Office for National Statistics, December 2014.

2 HMRC A disaggregation of HMRC tax receipts..Table 2, October 2014, shows Welsh tax receipts at £16.56 billion. In addition, council tax and business rates receipts in Wales accounted for some £2.3 billion in 2013. Source: OBR: http://budgetresponsibility.org.uk/wordpress/docs/Council-tax-growth-March-12-EFO.pdf; Stats Wales: https://statswales.wales.gov.uk/Catalogue/Local-Government/Finance/Non-Domestic-Rates/Collection/collectionofnondomesticrates-by-year.

Chapter 1

A devolution dividend?

A devolution dividend?

Devolution for Wales was partly sold on the promise that an Assembly would be an 'economic powerhouse' for Wales.

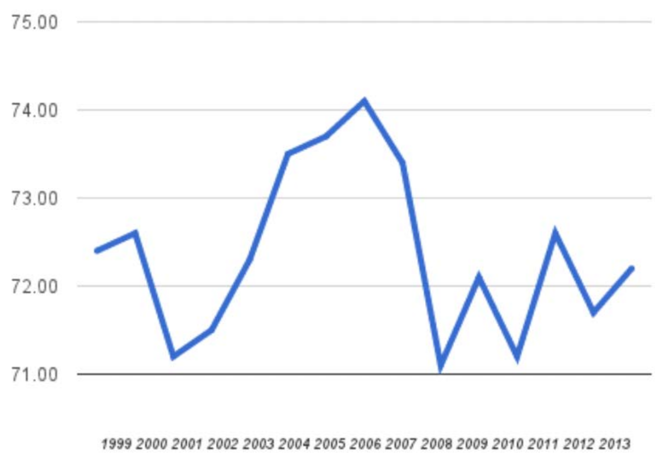
In 1999 the value of goods and services produced in Wales - the Gross Value Added or GVA figure - stood at 72.4% of the UK average. By 2013 it was essentially unchanged at 72.2%.

To be fair, the main macroeconomic tools are outside the control of the Welsh Government and National Assembly, and for a large part of the period since devolution a global economic slump has cast a long shadow. Prior to the collapse, the gap in GVA between Wales and the UK average was apparently narrowing slightly.

The performance of the Welsh economy strengthened between 1999-2005 - the period covered by its first economic strategy 'A Winning Wales'; and the gap with the UK average narrowed slightly, which may owe something to the cyclical nature of the Welsh economy. But in the global recession Wales' economy proved more vulnerable than the rest of the UK.

Since 2009, and the publication of the Welsh Government's most recent strategy 'Economic Renewal: A New Direction', Ministers have pursued a focus on encouraging inward investment, large scale infrastructure and support for businesses. Coinciding with this period the relative decline in the Welsh economy, which occurred in the recession, has been arrested with recovery and the Welsh share is back to 1999 levels.

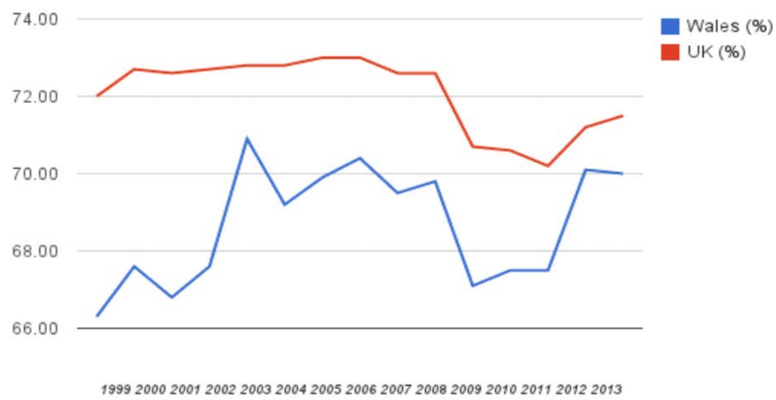
GVA: Wales compared to the UK (%)



From the outset of devolution, Welsh Government Ministers clearly wanted to prove that decentralisation would benefit the Welsh people, and set a range of ambitious targets including: boosting Gross Domestic Product (GDP) per person to 90% of the UK average, creating 135,000 new jobs, and reducing the number of workers without qualifications to fewer than 10%. 'A Winning Wales', launched in 1999, set out these clear targets and focused on disadvantaged communities, the green economy and sustainability.

On their own measurements the government did not succeed, though GVA and employment rose, while welfare claimants fell. The results were positive though the strategy failed to fulfil the intended level of achievement.

% of Working Age Population in Employment



'Wales: A Vibrant Economy (WAVE)', launched in 2005, continued to state that the priority was job creation and skills, disadvantaged communities and business expansion. Targets were recalibrated but the focus remained steady. On the whole, the trajectories established also remained steady - until the recession kicked in and GVA per capita fell for 2 years before stabilising. Wales was far less resilient than the rest of the UK and the comparative GVA figure fell by 2.3 percentage points. The whole UK economy suffered, but Wales came out worse than most.

While this seems to indicate that the Welsh economy is more cyclical than that of the UK as a whole, the data have some puzzling features. Among the industrial sectors experiencing the biggest falls in 2008-9 were water, sewage and waste management, which is not normally regarded as cyclical, and petroleum refinement. Petroleum industries, for example, have suffered from high operating costs and a steady decline in demand for conventional fuels. These two sectors accounted for over half the total drop in GVA. Moreover the public sector is relatively large in Wales, which would normally make an economy less cyclical.

2009 saw the launch of 'Economic Renewal: A New Direction' - a shift from the previous strategies deployed. High quality and sustainable infrastructure, inward investment and support for businesses were the new focus. No grand targets were set out, at least publicly, for this latest plan.

Welsh economic performance has stabilised but has not been boosted by devolution.

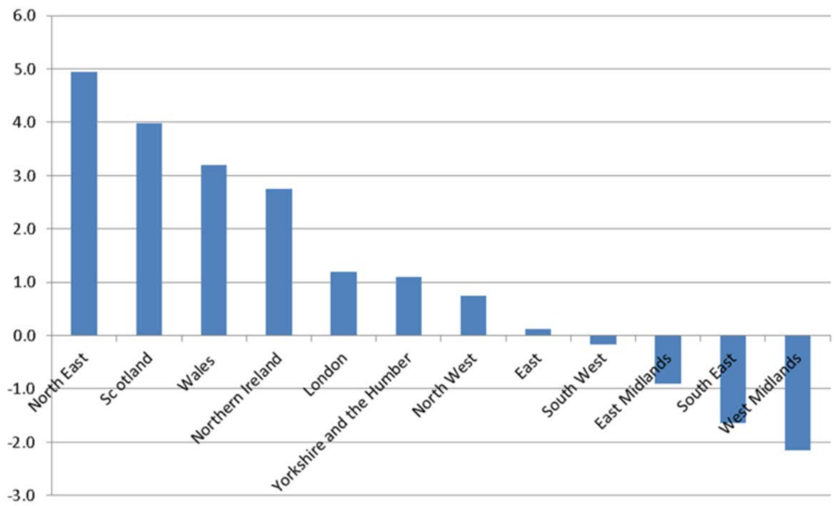
Relative GVA has not improved since 1999. This is not to say there hasn't been growth - there has, but policy during three strategic epochs Wales has not managed to close the gap with the rest of the UK.

Wales has for some time now operated at between 70-75% of the UK's GVA average - lower than

Northern Ireland and significantly lower than Scotland and England. Since it has held its own at that level it follows that regions growing more slowly than average have underperformed Wales and there are a number of such regions. Two regions had broadly similar GVA per head to Wales in 1999: the North East of England and Northern Ireland (which was slightly better off). Subsequently Wales has done better than Northern Ireland which has seen a drop in its relative GVA per head of some four percentage points. The North East, however, has outperformed Wales on this measure, its GVA per head rising by some 3 percentage points relative to the UK average. Scotland and London have both greatly outperformed while areas like the West Midlands have done much worse.

While Wales' GVA performance since devolution has been average, employment has done reasonably well, rising relative to the rest of the UK. That implies, however, that productivity per person has grown more slowly than average.

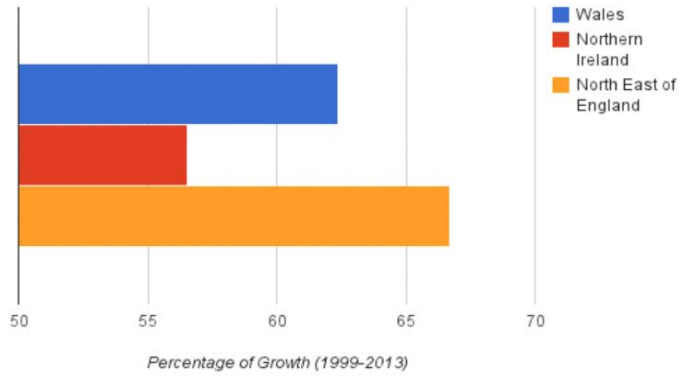
Change in employment rate (percentage points) from 1999-2014



Owing to economic growth, each person in Wales now generates 62% more value-added than in 1999 (£16893 per capita in 2013), much in line with the rest of the UK in nominal terms. Wales has held its own against economically similar regions; Northern Ireland underperforms Wales by around 6 cumulative percentage points over the period whilst the North East outperforms by over 4 points.

There is no evidence that being a devolved nation has boosted economic growth. Scotland and Northern Ireland both receive high levels of public spending but while Scotland has thrived, Northern Ireland has not. Wales receives around 5.3% of total UK spend and rather less per head than either of the other devolved territories. The North East receives less at 4.4% but the amount of public expenditure per head in each of these regions is nearly the same. Public expenditure does not appear to have had a significant impact on levels of growth.

Growth compared to similar regions



Whilst Wales lags the North East in GVA, it has higher employment and higher wages for full-time employees - implying that total wages in Wales may well be higher, even with more part-time workers. That would imply that the major explanation for a lower GVA therefore is profits - business in Wales is less profitable than in the North East. Regional attribution of profits data are, however, rather hit and miss so it is not clear how much weight can be put on that conclusion.

Consideration also needs to be given to geographical differences within Wales. The Welsh Government sometimes points to the fact that relative household income numbers for Wales are better than relative GVA - the Gross Domestic Household Income (GDHI) measure removes direct taxes and adds benefits, all of which improves the Welsh performance figures. Income numbers are particularly strong in regions close to the English border - Monmouth, Powys and Wrexham. Evidently some household members living in Wales are working in England so their GVA data does not appear in Welsh figures. In 2014, over 85,000 commuters left Wales each day to work and only 42,000 travelled into Wales. In net terms, this is a notable proportion of the working population - over 3% - whose data is not feeding into Welsh economic performance.

Another interesting feature of the data is that there is a correlation between growth of GVA and distance from the border. The areas farther from England have grown faster. The two outliers are Cardiff and Bridgend/Port Talbot which do better than their distance from the border might suggest. The most probable explanation of this phenomenon is that part of the growing labour force in the Eastern districts has gone to work in England; however, variations in the value of jobs may also have a part to play in this trend.

There is a belief abroad that the period since devolution has been one of continued relative decline in the Welsh economy. In fact that is not so. The Welsh economy suffered a big relative decline in the 1980s and 1990s. Since devolution the situation has stabilised although it is not clear that devolution is responsible for that. The earlier decline was caused by the phasing out of mining and the run-down of steel, followed by the departure of many turn-key manufacturing plants as lower-wage countries in Eastern Europe entered the EU and were able to undercut Welsh costs. It may be those processes had worked themselves out, leading to a new equilibrium, albeit at a low level. Be that as it may, devolution has clearly not resulted in any renaissance of the Welsh economy relative to the rest of the UK. It has been a middling performer, underperforming Scotland and outperforming Northern Ireland among the devolved territories. And it has somewhat underperformed the North East of England, the region whose economy it most closely resembles.

Can we do better? If so, how much better - and how? To those questions we now turn.

Chapter 2

Re-connecting finance with ownership

Re-connecting finance with ownership[1]

Rachel Bowen, Lucy Brill, Julie Froud, Peter Folkman, Sukhdev Johal and Karel Williams [2]

Wales has a double economic handicap. It suffers from an underperforming economy and from a failure of policy imagination about what could be done to address that deficit.

There is no easy fix for embedded and enduring problems in a country which has no tradition of radical economic thought. A serious political response to embedded problems requires prior intellectual effort on two related fronts.

First, we need a major reframing of Welsh economic problems and possibilities which takes us beyond the idea of closing the GVA gap with more fortunate English regions. We have taken up this challenge elsewhere with our ongoing argument about the foundational economy and its relevance to Wales.[3]

Second, we need a policy engagement with Welsh specifics which are largely invisible in reports which recommend generic policies – like infrastructural improvement – for Wales (as they do for every other laggard region).

This article is organised in a relatively straight forward way into three sections. The first section starts from observations about firm size and demonstrates that Wales has a problem about a missing Mittelstand[4] and absent Welsh brands because it has too few solid middle sized firms. The second section explains this absence by analysing the conditions of enterprise in Wales. UK wide problems about broken supply chains are in the Welsh case complicated by the topography that creates a corridor economy, and by a financial system that incentivises owner managers to sell early so that Welsh SME operations become adjunct branches of a larger combine. The third and final section on policy observes that many existing policies to encourage SMEs have the unintended consequence of incentivising early sale, and then proposes new forms of ownership and financial products which would strengthen owner manager incentives to hold and build.

A missing Mittelstand and absent brands

Much existing discussion of Small and Medium Sized Enterprises (SMEs) is preoccupied with the generic processes of economic renewal and firm growth and this framing has encouraged a focus on start-ups and the minority of fast growing firms, especially in sectors which embody high tech and high productivity. All this is of limited relevance to Wales for several reasons, most of the Welsh economy produces mundane goods and services, few in any economy sustain high growth rates for long, and small firm experts in the US and UK long ago concluded that exceptional success cannot be easily predicted or replicated[5].

It is often more interesting to discuss enduring peculiarities in the stock of SMEs firms in a national or regional economy. High rates of churn are inevitable when up to 15% of SMEs typically fail each year; but stock characteristics often change very slowly because (as argued in the next section), the conditions of enterprise change slowly. On firm stock, Wales has long standing and specific weaknesses in two respects: first, a very small number of medium sized SMEs, and, second, a very weak presence in branded, identifiably Welsh consumer goods. Let us consider both specifics in turn

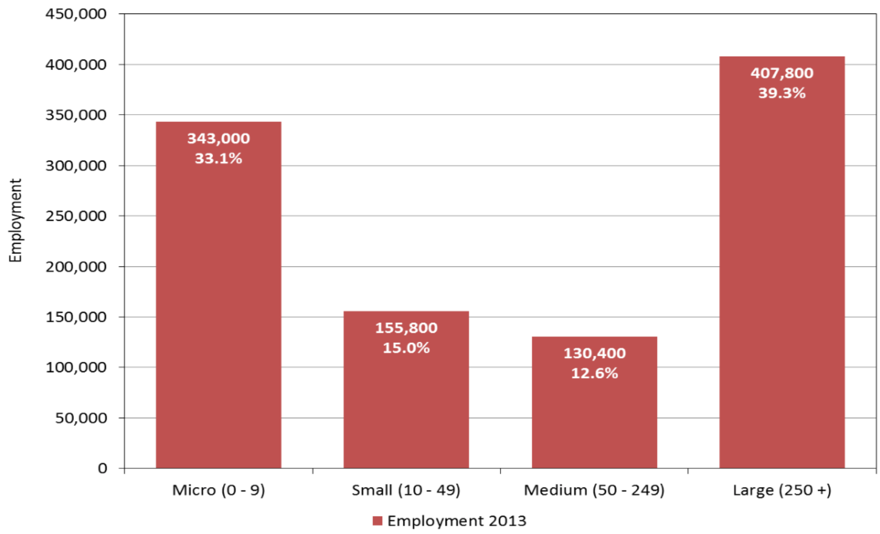
If we consider firm size in Wales, the most obvious structural economic peculiarity is the missing Mittelstand small and medium size enterprises. Exhibits 1 and 2 show that Wales in 2013 has more than 200,000 firms but only 8,000 small firms employing 10-50 and 2,000 medium firms employing 50-250; as exhibit 3 shows this distribution is long established, and the increase in Welsh firms numbers by 50,000 over the past decade is almost entirely accounted for by micro firms.[6]

Exhibit 1: Wales' private sector enterprises, employment and turnover in 2003[7]

	No. of Enterprises	Employment	Turnover	Share of total employment	Share of total turnover	Share of total enterprises
	No.	*No.*	*£m*	%	%	%
Micro (0 - 9)	159,985	285,400	12,694	31.1	18.1	93.8
Small (10 - 49)	7,200	136,700	7,999	14.9	11.4	4.2
Medium (50 - 249)	1,735	114,800	9,195	12.5	13.1	1.0
Large (250 +)	1,615	381,600	40,192	41.5	57.4	1.0
TOTAL	**169,535**	**918,500**	**70,800**	**100.0**	**100.0**	**100.0**

As **exhibit 2** shows, the distribution of employment by firm size is strongly bi-modal so that a histogram shows not a bell curve but twin peaks.

Exhibit 2: Wales private sector employment by enterprise size in 2013



One-third of Welsh employment is in micro firms employing less than 10; here we have two men in a van or a small workshop because the average Welsh micro firm employs just 1.7 and its turnover (including bought in materials) is less than £80,000 per year. At the other pole, 40% of Welsh employment is in enterprises employing 250 or more; here we have branch factories, large call centres and such like.

With three-quarters of employment concentrated in micro firms or large enterprises, small and mid-sized firms altogether account for just over 25% of Welsh employment. This Welsh peculiarity is part of a larger UK problem because England or Scotland also have missing Mittelstands, although average turnover is substantially higher in UK medium firms.

Exhibit 3: Wales' private sector enterprises, employment and turnover in 2003[8]

	No. of Enterprises	Employment	Turnover	Share of total employment	Share of total turnover	Share of total enterprises
	No.	*No.*	*£m*	%	%	%
Micro (0 - 9)	207,500	343,000	16,351	33.1	14.1	94.6
Small (10 - 49)	8,300	155,800	11,879	15.0	10.3	3.8
Medium (50 - 249)	2,015	130,400	13,638	12.6	11.8	0.9
Large (250 +)	1,590	407,800	73,744	39.3	63.8	0.7
TOTAL	**219,405**	**1,037,000**	**115,611**	**100.0**	**100.0**	**100.0**

The low turnover in medium-sized Welsh firms relates to a peculiar weakness arising from the absence of identifiably branded Welsh consumer goods. Of course matters are confused by the way in which prestige English brands are wrapped in the Union Jack as in the case of Land Rover or Brompton bicycles. But Wales has nothing that, in terms of international recognition, corresponds to Scotch whisky or Irish Guinness. This point was made by Rhys David in a 2007 IWA memo to the Welsh Affairs Select Committee lamenting the "absence of indigenous Welsh companies projecting their own brand". He then posed a rhetorical question: "ask people in England, leave alone the rest of Europe, to name a product that instantly says Welsh and excellent and you are likely to get blank stares"[9]. Across Northern Europe, Ifor Williams horse boxes and trailers are the only branded products that clearly meet this test of visible Welsh excellence.

The general absence of Welsh brands with major market presence is quite striking. Welsh lamb means something but, as Rhys David argued, the Welsh "have failed to establish even a major dairy products industry". A subsequent survey of Welsh consumers established that point; only 47% of consumers were able to name a Welsh brand of milk and half that group named a supermarket own brand of Welsh milk[10]. If we consider more recently established branded products, like bottled water, the results are equally discouraging: when the "spontaneous awareness" of branded drinks by Welsh consumers was tested only two Welsh brands of bottled water (Brecon Carreg and Ty Nant) made the list with more than 5% brand aware. European and emerging market consumers will obviously have much more difficulty in identifying branded Welsh products. This then helps to create a vicious circle effect for new Welsh brands so that a recent survey found that only one in five emerging market consumers said a Welsh flag would attract them to a product, whereas 64% said the union jack would attract[11].

The conditions of enterprise (including ownership)

The statistics on firm size allow us to reframe Welsh economic problems in a more focused and structural way. If the Welsh can add an extra 50,000 micro firms[12] in the past decade, they do not lack enterprise and dynamism; but if the Welsh cannot build a Mittelstand and brands, they will always lack the solid market presence that sustains investment and technik. This crucial failure can be explained by considering the heterogeneous conditions of enterprise in Wales and the rest of the UK which create a productive and financial ecology that does not sustain a Mittelstand.

The first set of conditions arises from the broken supply chains which are a consequence of recent British economic history; in the Welsh case, this is compounded by the specific and permanent handicap of topography and the mountains in the middle which make Wales a corridor economy.

The second set of conditions arises from change of ownership and the way in which the financial system facilitates exit strategies for founding owners of Welsh SMEs: the founding owner realizes a capital gain by selling out to a larger combine which runs the Mittelstand firm as an adjunct branch. Let us consider both problems in turn.

Thatcher and New Labour presided over a process of careless deindustrialisation. The old British anchor combines, like GEC and ICI, were broken up by a combination of internal incompetence and external pressure for shareholder value. The result was whole sectors, from cars to building materials, dominated by foreign owned branch manufacturing. This was associated with broken British supply chains because branch plants were typically integrated into the European and global supply networks of foreign parents. A high propensity to import components is consequently embedded in the structure of British industry: a survey in 2012 for the Department of Business Innovation and Skills showed that only 36% by value of UK auto parts were UK sourced.[13] Domestic component suppliers are also concentrated in the lower tiers producing low tech, bulky items like exhausts for cars: Britain has no first tier supplier like Valeo or Bosch capable of supplying an electronic sub-system like engine stop start. The fragmentation of assembler demand and the absence of first tier coordination together ensure that there can only be a small British Mittelstand in automotive or many other sectors

In the Welsh case, the specifics of topography compound these problems in ways which are curiously not recognised in reports for Welsh government.[14] The problem is the mountains in the middle which divide the Welsh economy into three corridors: the Cardiff Newport/M4 corridor, the Wrexham/Flint corridor and y fro gymraeg. The two industrial corridors are short and disconnected; the longer corridor from the Severn Bridge to Pont Abraham at the end of the M4 is just 80 miles long. In this case, the firm supply chain is often physically longer than the Welsh corridor which is defined by a fast road out of Wales. European manufacturing and distribution works through long distance trucking within and across national boundaries. Suppliers are often not located adjacent to assembly (as in Japan) though some European sectors, like textiles, are geographically clustered. The problem of Wales is that it has few clusters and large branch factories like Ford Bridgend or Airbus Broughton which do sustain a Mittelstand but mainly somewhere outside Wales through their large scale import of components. And when these large Welsh branch plants close, like Sony at Bridgend, they pay off their workers and leave behind no local Mittelstand of suppliers which is capable of finding different customers.

The organisational bias against a Welsh Mittelstand is reinforced by a financial system which incentivises early sale by the founding entrepreneur whose Mittelstand business then becomes an adjunct branch of larger combines which then play pass the parcel with relatively small non-core operations. This problem can be tracked by following up the good news stories about founders selling out to realise their reward for building a business. The most recent story was of Hayley Parsonss selling Go compare, the Newport based insurance price comparison site she founded in 2006. Nearly ten years later, it was reported that Ms Parsons would sell her shares in the company for £95 million from which she would personally receive £43.7 million. Go compare went to Eastbourne based esure with Ms Parsons insisting that the new owner would respect the company's Welsh roots:

> *"I have always said that the staff at Gocompare.com come first and I will always do the right thing by them. As such, esure's commitment to keep our headquarters in Newport was an extremely important part of my decision to sell the business and I am confident that I'll be leaving it in very safe hands"*.[15]

The question then is whether, in the longer term, the next owner(s) represent a safe pair of hands for the brand and the workforce. Here we have case evidence for the processed food sector which is important because this is a sector where Welsh brands should be more prominent; branded Welsh food draws on our agricultural heritage and is a defence against supermarket buyers who use their power to take margins from the makers of own brand supermarket lines[16]. Rachel's Dairy in organic yoghurt and Halo Foods in healthy snack bars both started up in mid-Wales in the late 70s or early 1980s and were built by owner managers into credible branded Mittelstand operations before they were sold to larger combines and then passed on, with increasing confusion about brand identity and/or production location, amidst struggles with supermarket buyers over volume and margins. Here are two dismal stories:

— In 1999, the founding Rowlands family sold Rachel's Dairy to Horizon, a United States organic dairy company which initially expanded Aberystwyth operations. But in 2004 Horizon was bought by Texas based Dean Food, the USA's largest processor of liquid milk whose "Trumoo" line is the leading flavoured milk brand in the USA[17]. In 2009, facing an UK market in recession, Dean devised a new company logo "Rachel's" so that organic was less prominent on the pack[18] and then decided to focus on its core business by selling Rachel's.[19] The purchaser in 2010 was the French Lactalis combine whose major cheese brands include President and Galbani.[20] In 2012 Lactalis moved Rachel's into a joint venture with Nestle whose brief was to integrate Rachel's with other operations (which raised fears of redundancy)[21]. This corporate game of pass the parcel had produced four changes of ownership and control in less than 15 years.

— Halo Foods was bought back by its founder Peter Saunders after Nestle took over Rowntree in 1988 and then built to the point where it employed 500, mainly in mid-Wales[22]. In 2004, the company was sold to Glisten an AIM listed, acquisitive small health food combine from Blackburn which grew rapidly by reporting "record results"[23]. Glisten then hit a profits crisis in 2009-10.[24] This was resolved by delisting the firm and selling out to the much larger Finnish conglomerate Raisio[25] best known for its Benecol, cholesterol lowering products; Raisio in 2013 then sold some non-dairy operations to Norwegian wholesaler Kavli Group.[26] Raisio/Glisten then concentrated Halo production in Newport after obtaining a £356k grant from the Welsh government which was concerned lest production be moved to Eastern Europe[27]; the founder complained that the Tywyn factory had closed which "left many people without jobs, creating a devastating impact on a small community".

In many of these stories, it is difficult to avoid foreign (i.e. non-Welsh and non-British ownership). This is especially so in food. For example, the two Welsh bottled water brands with brand awareness are both foreign owned: Ty Nant is owned by an Italian drinks distributor and Brecon Carreg is owned by the Belgian Spadel group, a Benelux based competitor for the likes of Nestle. For this reason it is important to insist that the problem is not ownership per se but financialized calculation in a world where stock market valuations and private equity returns from "flipping" firms both depend on delivering rates of return and growth (which is most easily achieved by acquisition). These motives and calculations are increasingly present amongst Welsh entrepreneurs who can themselves initiate the moves which dilute a Welsh brand and demote the Mittelstand firm to adjunct branch.

The best example of this is Tinopolis, the Llanelli based TV production company built from early contracts to make programmes for the Welsh language channel S4C. The founder was Ron Jones who had previously been a partner in Arthur Andersen[28] which was (until its post Enron collapse) the most aggressive of the big accounting and consultancy firms. Tinopolis joined the AIM market by reverse takeover in early 2005[29] and, before year end, had acquired TV Corp which bought in the independent producers of BBC Question Time and a portfolio of sports programmes[30]. In this phase, Ron Jones was very clear that "there is a tendency in Wales to sell out early, but we don't envisage doing that"[31]. In 2008, Tinopolis management bought the company back with support from private equity firm Vitruvian partners in a £45 million deal which allowed shareholders to cash out at a premium price. By 2012 the company had made further acquisitions in the US and UK of A. Smith and Co[32], BASE productions[33] and Firecracker Films[34]; and the founder was then talking about "building a global company still rooted in Wales"[35]. By autumn 2014, Tinopolis management were marketing the company to media companies and private equity firms, seeking interest in the sale or part sale of Tinopolis with a guide price of £300 million[36]. The identity of the purchaser and commitment to local brand and operations are usually irrelevant when private equity seeks an exit that will realise gains.

Connecting SME finance with ownership

On SME finance, the Welsh political classes are currently preoccupied with the Task and Finish Group's March 2015 proposals for a Development Bank for Wales which were argued using the language of "funding gap" and "market failure"[37]. This reflects a political consensus about institutions and lending practice: the political assumption is that Finance Wales is a failed institution and should be replaced by a new Development Bank for Wales; the economic framing is that existing finance provision is restrictive and the funding task of finance is to support SMEs by making cheaper finance more readily available. This same economic framing animates the Westminster and Whitehall debate and the policies of the BIS Department because centrist policy makers have a long standing preference for the generic indirect policy of adding finance rather than directly intervening to address the specifics of industrial organisation and supply chain problems in key sectors. Within this conventional Welsh and British framing, the problem of sales which create adjunct branches and hinder Mittelstand development becomes invisible, and there is no recognition that policies to improve the supply of finance may unintentionally establish perverse incentives for early SME sale to outside owners with limited commitment and larger concerns. Against this we would argue that the missing Mittelstand is an important problem in itself which *inter alia* requires innovative policies to sustain continuity of ownership that ballasts and stabilises the development of SMEs and Welsh brands. Let us turn to developing these arguments before proposing some new policies

The funding gap can be talked up by argument about the volume of bank lending to SMEs which has always been low in the UK and more recently has been declining in the aggregate, while often subject to onerous conditions about security and sometimes arbitrary demands for repayment. But, the high street banks can reply that current UK wide evidence shows they are already supplying cheap loans and overdrafts to a large proportion of the SMEs who apply for them. A 2013 survey by the University of Surrey concluded that 74% of SMEs who seek finance in any one year obtain it[38]; and, as long as monetary policy is ultra-loose, bank finance is typically cheap so that the current median interest rate for fixed rate lending is less than 4.5%[39]. A closer examination of the surveys shows low demand from debt averse SMEs; the Surrey University survey showed that only 20-25% of SMEs seek finance in any one year and the authoritative BDRC survey classifies 43% of SMEs as "permanent non borrowers" and reports 71% of SMEs interviewed in 2014 "agreed that their aim was to pay down any existing debt and then remain debt free"[40] If we then turn to key sectors of the Welsh economy, like food processing, we find that insecurity and power relations limit the SME appetite for debt (and also for investment from retained earnings): when we worked on the pig meat supply chain, we were repeatedly told that investment in process improvement was pointless for processors because all the gains would be captured by the supermarkets[41]. The implication is straight forward: freeing up the supply of finance will only produce benefits if it goes hand in hand with demand side measures to increase security for SMEs and micro businesses.

Meanwhile, existing policies to improve the supply of finance and incentivise entrepreneurs can add perverse incentives for early sale rather the retention of family and owner managed businesses over the long term. To understand these unintended consequences, it is necessary to understand existing SME support schemes which fall into three broad categories: first, support for lending to SMEs; second, support for equity investment in SMEs; and third, incentives to entrepreneurs and SME owners through the tax system. The detail below is technical and may be tedious but illustrates the complexity of existing provision and is necessary to the development of the argument about how worthy schemes can have unintended effects.

Lending to SMEs carries a higher level of risk than lending to larger and more stable enterprises. For this reason, both cost of finance is higher, and availability is constrained. Several government schemes seek to mitigate the risk by providing guarantees to lenders[42]. The National Loan Guarantee Scheme (NLGS) uses government guarantees on unsecured borrowing by banks, enabling them to borrow at a cheaper rate. Participating banks pass on the entire benefit that they receive from the saving of up to 1%. Community Development Finance is a £30m subsidy scheme operated through the Co-operative Bank and Unity Trust Bank to support small, micro and social enterprises in specific disadvantaged areas. The Enterprise Finance Guarantee (EFG) is a loan guarantee scheme aimed at firms with insufficient security or track record, under which the government guarantees 75% of the facility. Business Finance Partnership is a £1.2bn facility used to match an equal amount from the private sector invested through new funding sources aimed at SME's. The scheme's aim is to encourage the supply of capital through non-bank channels. The government will provide up to £100m to match lending through seven new players: Market Invoice, URICA, Beechcroft Capital, Funding Circle, Zopa, Boost & Co, and Credit Asset Management.

Other schemes are aimed at firms wishing to raise equity finance. They fall into two categories[43]. The first is tax incentives to investors (venture capitalists, business angels, family or friends) to compensate for the additional risk of investment in SMEs. The second is public provision of low cost capital to specialist fund managers for investment in qualifying SMEs.

— Tax based schemes include the Seed Enterprise Investment Scheme aimed at early stage companies wishing to raise up to £150,000 equity finance. Investors may offset 50% of the cost against income tax. Under the Enterprise Investment Scheme, for companies employing less than 200 people, investors receive income tax relief of 30% of the investment cost and tax free capital gains if the shares are held for 3 years. The Venture Capital Trusts Scheme mitigates the risk of investment in SMEs by permitting the investor to channel the funds through an Investment Trust which provides the advantage of a diversified portfolio of companies. Investors may offset 30% of the investment cost against income tax, receive tax free dividends and capital gains. Eligible companies must employ less than 250 people and have net assets of less than £15m.

— A second series of schemes provides public sector investment capital to fund managers. The Business Angel Co-Investment Fund is a £100m fund aims to support business angel investments in high growth potential early stage SMEs. It does this by investing alongside syndicates of business angels (up to a limit of 49%). The Enterprise Capital Fund Programme scheme is aimed at small high potential companies where the size of investment is small and relatively costly to administer. This programme provides funds to private sector fund managers and comes in the form of capital into the fund capped at two thirds of the total fund size or £25m. The UK Innovation Investment Fund is aimed at technology companies in "strategically important sectors" and is invested through private sector fund managers.

There is a separate structure of incentives through Capital Gains Tax and Inheritance Tax Reliefs which provide significant incentives to owner manager entrepreneurs and outside investors. Capital Gains Tax-Entrepreneurs Relief offers rebates on capital gains tax which is currently 28%. Owner managers are offered a concession so that up to £2.0m of lifetime gains are taxed at 10%. This concession only applies to qualifying shareholders so in the case of family owned Mittlelstand companies there may be different treatments between shareholders. Under Inheritance Tax- Business Property Relief, business assets are exempt from inheritance tax. On death the value of the asset for capital gains tax is ordinarily rebased at the market value on death. This means a tax saving of 40% of the value of the enterprise, making business assets a highly attractive asset class from a taxation point of view.

The policies above would usually be judged against their stated objectives which are to help SMEs start and grow. They do this either by making finance available, which otherwise would not be, or enhancing returns to investors, by subsidising the cost of investment, thus enhancing the rate of return on the realization of the investment. But, from our point of view, their effect is to construct a structure of incentives for owner managers to sell early not hold the firm. The policies do not all work to establish one consistent set of incentives. Thus, Inheritance Tax Business Property Relief is a very significant incentive to retain qualifying assets, while the capital gains tax concession focuses entrepreneurs on life-time gains. But all the other policy measures provide incentives for early sale. Cash flow pressures from short-term borrowing place constraints on entrepreneur managers; other tax concessions focus investors on early realisation of their investment. While venture fund managers' incentives encourage early realization of investments: the funds they run are limited life closed end funds with personal remuneration, through carried interest, tied to cash to cash performance. These incentives for owners and outside investors are reinforced because many of these schemes have criteria limiting the size and nature of qualifying businesses. So, holding on to grow the company beyond, say, 250 employees is unattractive because larger companies are disqualified under many of the schemes, or the size of the investment offered is not sufficiently large to be of interest.

If the structure of incentives is generally perverse and encourages early sales, we can only devise policies that provide different incentives after considering the motivations of Mittelstand owners and managers. After all, capitalism is a system where owners are free to do what they will with their own property and firm founder owners have earned that right through effort and property rights. The aim of policy should be not to impede sales of the business but construct incentives for holding, around the structure of legitimate owner manager motivations:

— **Diversification of family assets.** Successful entrepreneurs have a disproportionate share of their personal wealth tied up in their business and a sale is motivated by the desire to diversify personal wealth. Schemes to permit a partial disposal while retaining full control would be helpful.

— **Freedom to take income.** Generally owner managers sacrifice current income for future capital gain. Investor investment terms, which constrain owner managers from taking income, which may be used to build private savings outside the business, often act as an incentive for a sale earlier than the management would have chosen.

— **Income for family shareholders.** For family owned businesses, dividend income is often a strong motivation for shareholders to retain ownership. Meeting this requirement should be a feature of scheme design.

— **Estate planning.** Business asset relief is an incentive to those wishing to protect the family wealth from generation to generation.

— **Funding for growth.** Owners will wish to ensure that any steps to achieve their other objectives will not constrain funding options for future growth.

Any new policy intervention should seek to meet the objectives of continuing managers as described above while providing liquidity to investors in Mittelstand SMEs. It should also provide long term lending facilities to SMEs which mitigate the cash flow constraints of current options. There are a variety of ways in which these objectives could be met. There are two practical suggestions, about using ownership and new financial products, which we put forward as a way of starting debate about reframed SME policies. The activities of organised money are built on arbitraging the privileges of limited liability and tax relief on debt through the construction of corporate hierarchies which maximise private net gains for one class of investor; similarly new instruments are used as a basis for booking profit and maximising private gains. Why should the devil have the best tunes? Our idea is that this kind of imagination and innovation can be applied for constructive social purposes to change owner incentives and help build a Welsh Mittelstand.

On ownership, the simplest option is to use legislation regulating Employee Ownership Trusts which is already on the statute book. An Employee Ownership Trust may be established to hold a minimum of 51% of the equity of a private company. As an incentive to sell to such a trust the transfer of shares for cash is free of capital gains tax. The merit of the structure is that the corporate structure and management of the company owned by the trust remains in place. The trustees of the trust can be the existing management of the business. Although majority shareholding is owned on behalf of the employees, the employees do not run the business. This structure therefore provides liquidity to those wishing to sell, while leaving management and non-management shareholders with a continuing personal stake should they so choose. Finance Wales or the new Development Bank could be asked to consider assisting with the funding of the trust and if appropriate take a position as trustee to look after the broader public interest. If in due course it became appropriate to sell the business, then the trustees are open to do so in the normal way. The brief to the new Development Bank would be to promote Employee Ownership Trusts to private companies in Wales and to assist in this ownership structure as an alternative to outright sale.

Another possibility is a new product which would allow long term lending with returns tied to a share of exit proceeds. This product would address the investment needs of qualifying SMEs. The concept of loan repayment and rolled up interest is already well developed in the bond market with the use of Payment in Kind (PIK) Notes, frequently used in private equity transactions. A long term loan product which pays a below market cash interest rate supplemented by final payment out of the proceeds of sale of the business may be highly attractive in that it deals with the cash flow constraints on owner managed businesses. Subject to meeting covenants the managers would be free to draw income to achieve diversification of their personal wealth. Finance Wales or the new Development Bank could hold these assets on its balance sheet subject to appropriate support from the Government of Wales.

Instead of a conclusion

We have presented evidence and developed an argument about firm size, conditions of enterprise in Wales and the need for new policies to change owner incentives and thereby help build a Mittelstand and Welsh brands. This all represents work in progress intended as a positive contribution to debate in the Welsh policy community. The medium term aim is, of course, to influence Welsh Government thinking on what policy and institutions like the new Development Bank might do. Our approach to economic policy is to engage Welsh specifics and then propose non-standard policies. Such policies would of course be experiments, undertaken without any assurance of success. But, the accumulating problems of Wales are now beyond orthodox thinking and generic policies. It is time for some experiment in Wales.

Notes

1 This short article reports some research undertaken as part of a larger ESRC and Federation of Small Businesses (Wales) project on alternative economic policies for Wales. The main project report will be published in autumn 2015.

2 Rachel Bowen is policy manager at Federation of Small Businesses (Wales). Lucy Brill is researcher on the FSB/ESRC Welsh policies project. Peter Folkman, Julie Froud and Karel Williams are all professors at Manchester Business School; Sukhdev Johal a professor at Queen Mary at University of London. The senior academics have worked as a team at the Centre for Research on Socio Cultural Change (cresc.ac.uk) and are currently developing the new Manchester Capitalism book series (manchestercapitalism.co.uk)

3 See the foundational economy references at http://www.manchestercapitalism.co.uk/foundational-economy; and for Wales see the "Where is Wales" presentation for WISERD Cardiff http://www.slideshare.net/AdamLeaver/wiserd-wales-v2-kw-9-dec-

4 Mittelstand refers to small and medium-sized enterprises in German-speaking countries, especially in Germany, Austria and Switzerland. Economic and business historians have been increasingly giving Mittelstand companies more and more credit for Germany's economic growth since the beginning of the 20th century, often under the name of hidden champions.

5 D. J. Stofey (1994), *Understanding the Small Business Sector*, pp. 158-9

6 This data is categorised as 'private sector'. However the ONS classification of the 'private sector' is broad as businesses are either as in the private or public sector. There is no intermediate classification so there is some blurring as hybrid businesses like charities are classified as public sector and universities and GPs are classified as private sector. The data will inevitably include activities overwhelmingly dependent public sector funding through either reclassification or the activity has been outsourced. Broadly the Public Sector is excluded from this dataset.

7 Source: StatWales.

8 Source: StatWales.

9 David, R. 2007. "*What Visibility for Wales? Connecting with the Consumer.*" Memorandum from Institute of Welsh Affairs submitted to the Welsh Affairs Select Committee Inquiry Globalisation and its Impact on Wales, (GLOB 12). http://www.publications.parliament.uk/pa/cm200607/cmselect/cmwelaf/ucglobal/m8.htm

10 Enterprise Planning and Research (2012) Welsh Dairy Products: Consumer Study Report

11 BBC News (3 October 2014) " Britain best brand for Welsh exports", http://www.bbc.co.uk/news/uk-wales-29461272

12 Source: StatWales. In 2003 there were 158,985 micro enterprises and by 2013 this had risen to 207,500 enterprises.

13 Business Innovation and Skills Department (2012) *Growing the UK Automotive Supply Chain*

14 (2014) Centre for Supply Chain Operations and Productive Excellence, *Manufacturing Supply Chain Demand Study*.

15 http://www.theguardian.com/business/2014/dec/08/go-compare-founder-bank-44m-selling-remaining-stake-esure

16 A. Bowman et al. (2014) The End of the Experiment, MUP, Manchester; and Bringing Home the Bacon. CRESC public interest report at www.cresc.ac.uk

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35 http://www.walesonline.co.uk/business/business-news/tinopolis-buys-television-firm-base-1814934

36 http://www.theguardian.com/media/2014/oct/08/question-time-tinopolis-sale

37 Task and Finish Group (2015) A Feasibility Study into the Creation of a Development Bank for Wales http://gov.wales/docs/det/publications/150311-development-bank-wales-en.pdf

38 University of Surrey et al. (2013) SME Success in Challenging Times: Bank Finance – lost in translation, p. 1

39 BDRC Continental (2015), SME Finance Monitor Q4 2014, pp172-99 on cost of finance

40 BDRC Continental (2015), SME Finance Monitor Q4 2014, pp. 11-12

41 A Bowman et al (2013) Bringing Home the Bacon, cresc.ac.uk

42 Business Innovation and Skills Department (2013) SME Access to Finance Schemes: Measures to Support SME growth, p 4 et seq

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Chapter 3

Closing the gap

Closing the gap

The case study and paper by the FSB researchers illustrates the complexity of problems and the diversity of current thinking; so, what should be done?

Rachel Bowen et al, have pointed out that Wales lacks a stratum of middle-sized companies producing branded goods that give them a secure competitive niche. One of the authors, Professor Karel Williams has also argued that Wales could ask more of the large companies that have operations here, especially those companies that are “grounded” and unlikely to move for one reason or another. The idea is to encourage or press such firms to develop more linkages to the local economy through their choice of suppliers, and to encourage them to bring more of their own activities to Wales.

As well as helping small and medium-scale local businesses to develop, as the FSB (Wales) researchers recommend, the Welsh Government has shown an interest in aiding mutual enterprises as another way to foster economic activity, relying on the enthusiasm of local groups.

These approaches focus on the benefits of encouraging employment and economic activity in areas of limited economic opportunity and would make a contribution to raising Welsh growth. Almost all rapidly-growing economies have built their success on an export boom. Bowen et al emphasise the need to develop a Mittelstand of medium-sized companies and the Welsh public sector could do more to foster Welsh business through procurement policies. Procurement of goods and services by the Welsh Government, local authorities and other public services can be oriented to minimising the costs, notably the administration costs, of the procurer. This militates against the use of local suppliers. Local food producers, builders, and professionals like consultants and accountants can be passed over for larger suppliers outside Wales. Public-sector spending cuts that make economy even more important have arguably made it harder to resist the tendency. However, the Welsh Government has certainly looked to develop policy in this area, setting up a special section Value Wales within the Finance Ministry and creating a Supplier Board where it can discuss procurement with business organisations. The McClelland Report was commissioned to look at how public procurement could used more effectively to achieve growth and social objectives. [1]

The report was generally complimentary about the focus Ministers showed and the degree of attention they paid to the issue. Policy development was quite impressive, implementation less so.

The report found a shortage of procurement skills within the public sector that was particularly acute in local government where standards were highly variable. That conclusion has been echoed by others attending the Supplier Board who consider the Welsh Government’s own practices to be “better than in England” but still patchy while some local governments just ignore the policy.[2] Others have argued for more collaboration across the public sector active and a public-sector procurement agency, ready to appoint, mentor and develop local suppliers.[3]

The McClelland report found the Welsh public sector currently spent £4.3 billion a year on goods and services and roughly half of that is outside Wales. Central and local government spent rather less outside Wales and the health service spent more. Switching a quarter of the external spending to local suppliers would increase Welsh GVA by an appreciable 1% and generate many jobs, perhaps 10,000.

Another area of existing policy focus where perhaps more could be done is housing. There are a number of economic arguments for greater investment in housing identified by MacLennan and O'Sullivan in the Scottish context which apply equally to Wales[4]:

— housing can reduce economic performance if it impedes labour mobility, fails to contribute to the attractiveness of regions and cities as places to locate new economic activity,

— the quality of housing has important implications for health, education and other outcomes that impact on national productivity and economic growth.

— housing design and siting have important consequences for environmental outcomes.

It is estimated that an average of 14,200 new dwellings are needed each year until 2026 and around 90,000 people are on housing waiting lists across Wales; this includes people who want to move within social housing.[5] Some action is underway, with significant government support currently in place through the Help to Buy scheme. A planning reform agenda is set out in the recently introduced Planning (Wales) Bill and other recommendations made by the Housing Supply Task Force are being implemented.[6]

The Welsh Government's own modelling indicates that, for every £1 million invested in housing, 21 full-time job equivalents (FTEs) are supported. The most recent Welsh Economic Research Unit (WERU) report on the economic impact of housing associations notes that, for every job within housing associations, (currently around 13,000 people are employed by housing associations), another 1.5 FTEs are supported in other sectors within the Welsh economy.[7]

An investment of approximately £500 - £750 million over and above existing programmes could enable an additional 10,000 affordable homes to be built. This investment would support between 5,250 and 7,350 FTEs. Given the average salary in construction and property, those well paid jobs would boost economic activity throughout Wales. That would have to be financed and with other claims on its capital budget, the Welsh Government has limited ability to increase its grants.

However, the 11 Welsh local authorities that have housing stock will be exiting the Housing Revenue Account Subsidy scheme enabled by the Housing (Wales) Act 2014. This will give these local authorities some capacity to borrow in order to build new homes; the amount will vary between authorities dependent on how much progress they have made towards the Welsh Housing Quality Standard. A significant increase in the output of affordable homes may require a delivery vehicle at an all Wales level such as that in place in Scotland (the National Housing Trust which is part of Scottish Futures Trust).[8] Like procurement, this is an area where policy has been progressive but where implementation could be improved further and financial innovation is needed.

Investing for significant catch-up

So much for incremental improvement. What about catch-up growth? Public policy cannot ensure fast growth but would be critical to achieving it. The State can make sure the necessary preconditions for growth are in place and it can provide early-stage encouragement to businesses that appear to have growth potential.

—Education

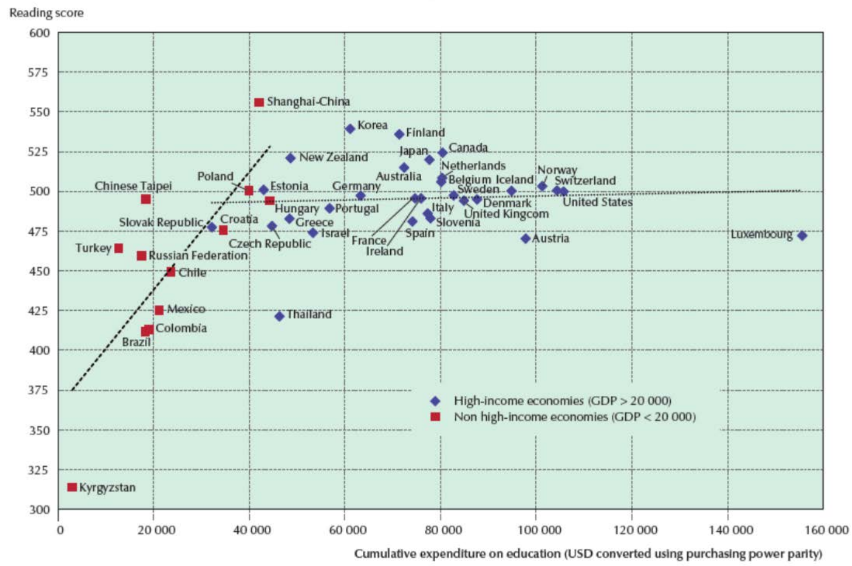
A most important area is skills: general skills, analytic skills and skills necessary for specific growth industries.

Wales has well-publicised problems with relatively poor performance in international measures of pupil accomplishment. International surveys such as the OECD's PISA point to significant in our performance compared to our economic competitors.

The Welsh Government has attempted to respond to pressures to address a highly complicated and overloaded national curriculum combined with increasingly dominant accountability mechanisms. Attempts to reform the system have included curriculum changes in 2008, and more recently there have been a number of 'Task and Finish' reports, consortia led initiatives on school improvement, and the reform of qualifications that is still under way. However, in spite of the investment made to improve the way we educate our young people, our workforce of tomorrow, expenditure per head on pupils in Welsh schools and HE institutions has been allowed to drift behind the rest of the UK.

In itself that might not be critical since OECD data show almost no relationship between spending per head and pupil attainment among developed countries (among developing countries where spending per head is generally much lower, there is a clear association between spending and results). Once a threshold of spending is reached it appears other factors than money are most important. Some of the highest achieving countries like Korea and Finland are modest spenders.

Average reading performance in PISA and average spending per student from the age of 6 to 15



Perhaps more worrying is the continuing decline in the performance of our most deprived and vulnerable young people compared to the rest of the UK. Comparing children eligible for free school meals (FSM) across England and Wales shows that 50% more FSM pupils gain 5 A*-C at GCSE in England than in Wales. By age 7 the reading ability of children in Wales is behind that of children in England and Scotland, irrespective of whether they are from families with relatively low or high incomes.

Wales abolished school league tables under pressure from teachers' unions without replacing them with any other means of monitoring school performance and ensuring accountability. Given the evidence of stagnating or declining standards there has been a step back towards a more rigorous policy of assessment and some anecdotal evidence of improvement. It seems certain, however, that a more sustained focus is required and a balance needs to be found which affords the professionals the requisite autonomy and respect while ensuring they are fully accountable for results, properly measured.

At the level of higher education there is a clearer need for resolving problems of inadequate finance. The work to develop the National Software Academy, launched as a three-way co-operation between a Russell Group university, a charitable foundation and business, is an important example of the kind of initiative that bolsters the local economy materially. The Academy aims to supply industry-aligned skills, hitherto in short supply, which could influence indigenous firms and inward investors alike to operate in Wales. It addresses the lack of a Higher Education Institution specifically attuned to contemporary technical and market developments, and will produce 300 graduates each year. By creating skilled software experts in possession of employable skills the National Software Academy is an example of taking focused action on development of skills and entrepreneurs, but more is required.

—Research and development

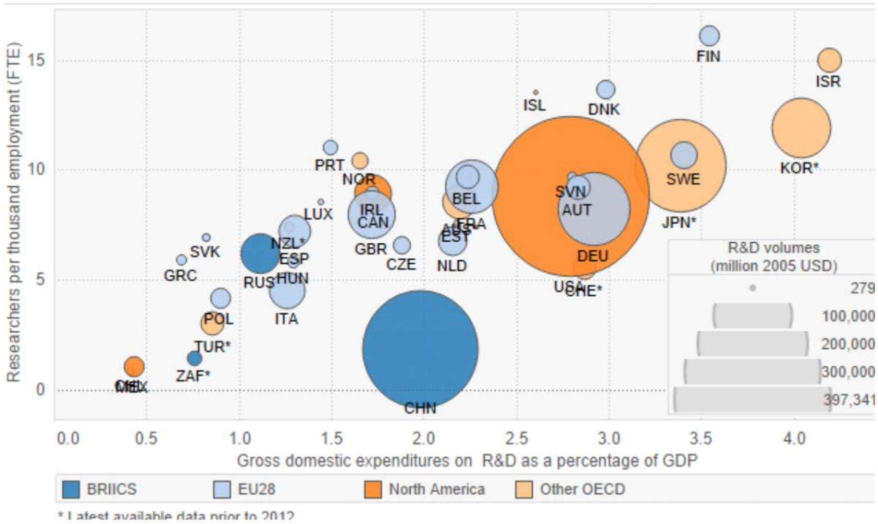
IInvestment in Research and Development (R&D) is almost universally regarded as a 'good thing'. Funding dedicated to developing new products, or development of existing ones, boosts productivity and GDP according the IMF, OECD, World Bank and the IFS.

Wales currently manufactures and exports some £15 billion worth of products – around 1/4 of our GDP. However, few international firms site R&D here and few local companies are R&D intensive.

R&D activities increase productivity directly by providing highly skilled, highly paid employment. To the extent that it enables the design and manufacture of up-to-date and competitive products, with the continuous development of innovative and efficient manufacturing methods, it generates still more well paid employment. R&D jobs tend to be resilient; even when low-skilled manufacturing jobs are lost through automation or off shoring, very often the R&D activities of a company remain. It takes time, money and effort to build strong R&D teams so closure of an R&D facility is not usually commercially attractive.

Since national expenditure on R&D as a percentage of GDP (R&DI) is widely recognised as a positive indicator of innovation and economic success, many countries adopt "targets" for this measure, to help focus policy decisions and allocation of public funds. The majority of EU member states have set 3% R&DI targets for 2020, with a current average of OECD countries standing at 2.3%. The UK lags behind this average at 1.7% of GDP, with Wales' R&DI spend even lower at less than 1.2%.

Human and financial resources devoted to R&D, 2012



In Wales, an estimated £569 million was spent on R&D in 2012 (0.1% down from 2011) and the main non-governmental contributors to R&D spending here were private sector business enterprise (48%) and higher education institutions (46%). Government spending accounted for only 5% of total R&D spend in Wales in 2012. It is apparent that Wales has catching up to do. An increase to Swiss levels of investment, for example, would mean spending more than double what we spent in 2012, somewhere in the region of £1.4 billion per annum. Obviously, budgetary constraints make it impossible to increase state investment on R&D rapidly. However, there remain several measures whereby government initiative could make a start in increasing R&DI in Wales.

Continuing support for excellent pan-Wales R&D collaboration schemes such as ASTUTE, where universities in Wales provide state aid funded R&D services to Welsh-based enterprises is important. It not only makes enterprise aware of what can be achieved with R&D but also makes the universities more commercially focused. With no powers to vary corporation tax, R&D tax relief against business rates to qualifying companies could encourage development or location of R&D facilities in Wales.

It's also important for the Welsh Government to assist businesses in taking advantage of Innovate UK investment schemes such as Knowledge Transfer Partnerships and Catapult. Catapult projects are a series of physical centres where the businesses, scientists and engineers work side by side on late-stage R&D. Disappointingly, there are currently no Catapult centres headquartered in Wales, this in spite of the relatively high ranking of Welsh universities in the 2014 UK Research Assessment Exercise.

Currently, Wales claims back only 1/3 of our nominal contribution to the annual £400 million Innovate UK budget. We must do better there and in attracting our fair share of European research project funds such as the large EU 7-year long R&D programmes - FP7 and the forthcoming Horizon 2020. The recently announced Welsh Government funded Innovation Point will provide EU and UK Research grant bidding support services to Welsh companies and is a step in the right direction. On the commercial side, local procurement of research-intensive products and equity support for the R&D phase of product development in areas like energy generation are also worth serious consideration.

In summary, Research and Development activities are vital for economic growth and productivity, and the UK and Welsh economies are currently under-spending on R&DI in comparison to other countries in the OECD and EU. In order to maintain competitiveness, we need to be finding ways of encouraging companies to invest in R&D.

Infrastructure

Another important area is infrastructure. But building roads at random will not help. It is necessary to have some view or strategy for where economic activity is likely or desired and what infrastructure is necessary to sustain it. The Welsh Government broke new ground with a National Infrastructure Investment Plan, but with no underlying economic strategy it is a list of projects that will happen as Departmental budgets permit. In the absence of a strategy and priorities resources will not be moved between capital budgets to reflect those priorities.

The Welsh government has a programme to roll out high speed broadband across Wales, which is surely essential, though there are questions about the deal with the major supplier and whether it will achieve its objectives at reasonable cost.

Another area of high importance is energy supply. Wales is bound by the EU target of reducing carbon emissions by 80% by 2040. The Welsh Government has endorsed this target and spoken of fostering economic development in Wales by concentrating on green energy, establishing here an industry whose products or expertise will be required worldwide as limiting climate change comes to be addressed with more urgency.

So far, however, this aspiration remains just that. Even if Wales were to double the efficiency of its energy use, to replace fossil-fuel based electricity generation with green alternatives would surely cost at least £10 billion, whether the strategy adopted was small-scale local distributed power generation linked by smart-grid technology, or large scale centralised generation by things like nuclear power on Ynys Mon, or large scale tidal barrages or lagoons. The former strategy would involve new applications of old technology, and no-doubt some innovations too, but it will not happen as a result of private enterprise. It would require a plan, an active push from the Welsh Government and a lot of risky investment.

It would be easier to let the big battalions haggle with the UK Government over guaranteed prices that take the risk out of projects like Wylfa B, the Severn barrage or a suite of tidal lagoons. There is no reason in those cases, however, (particularly the first two) why Wales is likely to generate its own green-energy companies. Once the mega power stations are built it will be a struggle to retain any specific intellectual capital. Wales is certainly not going to be the centre of expertise on nuclear power technology. And the Welsh government has not taken an equity interest in any of the mega projects even when it has expressed support for them.

If Wales is to have any hope of making green energy an important part of a growth strategy, it needs to plot a course of development that gives opportunities to medium-sized firms in Wales to develop their experience in the generation and transmission of green energy. It needs to carry out an inventory by experts of the potential for green energy in Wales, wind, tidal, solar and inland hydro. Then it needs a detailed plan for the phased exploitation of our natural resources. Privatised utilities have little interest in small-scale distributed generation or in providing the smart networks to make it feasible. Providing the detailed plan stacks up this should be a key part of our strategy for growth it is important to realize it will not happen without a public-sector push. If it can work it is the best chance of growing local firms with micro-generation expertise.

In any event to meet sustainability targets will require huge increase in energy efficiency, insulating buildings, using district heating in towns and moving to use of electric vehicles for public transport. These activities could also spawn Welsh businesses but only if public policy is settled and consistent in pushing those outcomes.

The economic case for making energy efficiency of Wales' housing stock a national infrastructure priority is strong. This sits alongside the environmental imperative with buildings being responsible for 37% of carbon emissions.

Economic modelling has recently been carried out of a UK-wide programme to bring all low income homes up to Band C on an Energy Performance Certificate (EPC) by 2025, and for all other households to be offered 0% interest loans to improve them to an equivalent EPC standard by 2035. The estimated cost for this programme at UK level is £50billion, £13billion within the next parliamentary term. Half the cash from government would target areas likely to contain fuel-poor households. The other half would go towards an 'able-to-pay' scheme, offering interest-free loans for all other homes.

This modelling concluded that, in addition to making all low income households highly energy efficient and reducing the level of fuel poverty, the programme would deliver:

- £3.20 returned through increased GDP per £1 invested by government
- 0.6% relative GDP improvement by 2030, increasing annual GDP in that year by £13.9bn
- £1.25 in tax revenues per £1 of government investment, through increased economic activity, such that the scheme has paid for itself by 2024 and generates net revenue for government thereafter
- 2.27:1 cost benefit ratio (Value for Money), which would classify this as a "High" Value for Money infrastructure programme
- increased employment by up to 108,000 net jobs per annum over the period 2020-2030, mostly in the service and construction sectors. These jobs would be spread across every region and constituency of the UK
- £8.61 billion per annum in total energy bill savings across housing stock, after comfort take (includes energy price inflation)
- 23.6MtCO2 reductions per annum by 2030, after accounting for rebound effects. This is roughly equivalent to cutting the CO2 emissions of the UK transport fleet by one third.
- improved health and reduced health care expenditure, due to warmer and more comfortable homes, and improved air quality. For every £1 spent on reducing fuel poverty, a return of 42 pence is expected in NHS savings
- a more resilient economy, less at risk of shocks in gas prices, as the economy becomes less reliant on fossil fuels. Investment in energy efficiency in the domestic sector will result in a 26% reduction in imports of natural gas in 2030, worth £2.7bn in that year.

There are approximately 1.13 million homes in Wales, just over 60% built before 1959. The rate of new build is about 0.5%. Constructing Excellence Wales notes that Wales has the oldest building stock in the UK. Much of the 2050 building stock is here now; estimates vary between 66% and 80%. In 2012, nearly a third of households in Wales were projected to be in fuel poverty, equivalent to 386,000 households.[9]

The Welsh Government has already acknowledged the validity of investing in the retrofitting of existing homes to increase their energy efficiency and thereby decrease energy use through investment in the Arbed and Nest schemes[10]. These schemes have achieved good results, but significant scaling up is needed to adequately address the duel issues of the energy efficiency of homes and fuel poverty.[11] The Rethinking Poverty report, by the Bevan Foundation, notes that at current rates, it will take 78 years for Nest to reach every home in which occupants are suffering from fuel poverty.

Using the cost of the UK-wide programme set out earlier as a starting point, the cost of a comprehensive programme to improve the energy efficiency of all homes across Wales could be around £3billion, £780million within the next Assembly term.

Alternative approaches to scaling up action on improving the energy efficiency of homes across Wales include:

— significantly increasing the capacity of the range of existing programmes (a third phase of Arbed is currently in development).

— putting in place a co-ordinated programme which takes a street by street approach, encompassing all tenures. This would require blended funding from a variety of sources (Welsh Government, European funding, ECO, home owner contributions, social landlords maintenance programmes etc.). This approach is recommended by the *Building the Future* report.[12]

Given the various policy imperatives, it would not be unreasonable to double existing investment in improving energy efficiency of homes, particularly those inhabited by people experiencing fuel poverty over the next Assembly term.[13] The Welsh Government's own modelling indicates that, for every £1 Million invested in refurbishing housing, 35 FTEs are supported. Such an investment would therefore support nearly 9,000 jobs, which would have a significant impact on generating income in the Welsh economy.

If a means could be found to encourage R&D in the use of insulation materials, and the fitting of equipment like heat pumps and to make this accessible to Welsh SMEs engaged in this field, Wales could develop a native industry in raising energy efficiency. That could also help in the construction of new houses, perhaps reinforced by gradually introducing tighter regulation. While the Welsh Government has been adamant on the need for sprinklers in new houses it has not been so forthright in mandating energy efficiency standards.

Wales needs to be ambitious on energy, becoming self-sufficient and that this can be a transformative asset with a much longer impact than King Coal. The appendix on energy generation gives further detail.

City regions as growth poles

Transport is another area where investment is required for sustainability. It has also been identified as having the potential to accelerate Welsh productivity by enhancing the connectivity of urban areas. The absence of a large conurbation in Wales is pointed to as one reason for lagging productivity, since productivity and its growth are often greatest in large cities. The bulk of the Welsh population is found in the south east of the country so one strategy is to improve the connectivity of the area to turn it into a single economic space - one extended city region, centred on Cardiff, stretching from Newport to Bridgend and embracing the valleys of central Glamorgan and Gwent. The centrepiece of such a scheme would be the 'Metro', an integrated development of rail, dual rail-tram and integrated bus routes that would link the whole region with high-speed, affordable public transport.[14]

The cost of a complete network has been conservatively estimated at £3 billion. It would need to be planned in conjunction with housing and other development. The scheme has captured the imagination of many in the Cardiff area and received expressions of support and modest budget allocations from the government. There is, however, a growing sense of frustrated anticipation. No substantial commitment of funds has been made, nor new executive institution announced, although there is widespread agreement that the metro cannot be delivered without a dedicated agency. An announcement of a not-for-dividend company by the Welsh Government to take the idea forward, alongside the creation of a not for profit all-Wales rail franchise, are promising. However, little detail has been made public and fears persist that the project could be downgraded with full, determined political commitment remaining elusive.

The project of course is unpopular elsewhere in Wales since it seems to favour the capital region at the expense of other areas. Indeed a commitment to the project may well require some politically balancing commitment to finance plans for a smaller growth pole somewhere in North Wales. A greater concern, however, is if the Welsh Government is simply reluctant to tackle a project on this scale. The degree of cross-departmental co-ordination required, the complexity of the administration required, the very large sums of money, surely requiring the use of private finance, and the probable need to delegate power to a dedicated executive agency, may be out of line with Welsh Government preferences to keep growth ambitions modest and low-key. Given how much money the Scottish Government was able to spend on a tram from Edinburgh airport into town, there is no doubt that the metro has the capacity to be a financial black hole. If as a country, however, Wales is not prepared to undertake projects on this scale, is it not ruling out any substantial economic catch-up with the rest of the UK?

How much investment is needed?

Growth requires investment. Leaving aside most of the government's Infrastructure Investment Plan and routine public investment to maintain the public capital stock, we can see that investments in energy efficiency and green generation could cost £10 billion over the next decade and a half. A Cardiff Metro plus a smaller-scale analogous development in north Wales could run to another £5 billion. Financing improved higher education could draw hundreds of millions more. Total finance requirements for an ambitious government could therefore run to £25 billion over the next fifteen years.

Welsh investment budgets have dropped to around £1 billion a year, most of which is routine or spoken for. An aggressive growth strategy would therefore require borrowing, firstly to the extent allowed by the government itself, secondly by consortia of local authorities and finally via the private finance markets. The Welsh Government in this area has always shown considerable caution, largely avoiding early-stage PFI and latterly keeping its private finance plans very modest. That is not necessarily wrong. Accelerating growth cannot be achieved by wasting money or building white elephants, but nor can it be achieved just by avoiding mistakes.

Without good projects and the readiness to take a chance on them, catch-up growth is off the agenda.

The Welsh Government could currently get long-term fixed interest finance for around 4%. The servicing costs on borrowings of say £10 billion would eventually run up to perhaps half a billion a year, just under 3% of the annual budget. If that is too frightening to contemplate, we are likely to be resigning ourselves to remaining a poor region of the UK with a GVA per head a fifth lower than average for decades to come.

And that is public-sector investment. Encouraging private sector investment must remain an important element of a growth strategy. Giving money away is surely an out-dated way of doing that. Nonetheless providing patient finance, debt or equity, is one role for a developmental state. At present, grants are handed out to boost development but this imposes too little discipline on recipients with consequent failures. And where there are successes, there is no return for the Welsh Government, which could be recycled for further investment. Grants socialise losses while leaving all returns in private hands.

Wales has one or two areas where we have competitive small to middle-sized firms which can draw on expertise in our local universities. Medical science is one such area. Encouraging such companies to pursue opportunities and providing patient finance is not something that private venture capital is likely to do. The venture capitalists want to see and "exit" for their money in three to five years, whereas the public interest is in building something rooted in Wales over much longer time periods. It is not a job either for public bureaucrats whose incentive structures are not appropriate. That is why the investigation by Welsh Government of the role of Finance Wales and the possible development of a Wales Investment Bank is an interesting development.

As the Manchester economists have pointed out, there may need to be reorientation in financial assistance to investing firms, to ensure objectives are truly long-term and to try and ensure that owner-managers keep their businesses independent and in Wales, rather than selling out to become branches of a foreign business. New instruments will be required that facilitate wealth diversification by the owner while leaving the business financed and providing means for management to take it on when an owner retires. Unless Welsh business owners follow the German model of seeing the business as a trust to be passed on to future generations *in situ*, rather than an asset to be sold for a comfortable retirement, even periods of fast growth will not leave the legacy that permits development to continue.

An investment bank wholly in the public sector will also be limited in scope because its lending will be limited by the Welsh Government's own departmental expenditure limit set by the Treasury. To avoid that, the state could take a minority interest in a public-interest but private company. That is the sort of hybrid with which the government has not been comfortable up to now.

Conclusion

The sorts of policy initiatives proposed by the FSB researchers are sensible. If allowed to influence Finance Wales or any successor organisation they could be the centrepiece of set of policies that could achieve a more robust economy and a modest acceleration in growth.

To achieve faster growth will require even more. Devising and implementing a new energy model for Wales involving a more energy-efficient housing and vehicle stock, distributed micro-generation and smart networks would require massive investment but could spawn a new industry of locally-grounded firms.

Concentrating and accelerating infrastructure investment in growth-pole areas with schemes like the Cardiff metro could also give the economy a boost, especially if a firm eye was kept on local content and local apprenticeships.

A renewed commitment to financing higher education at an appropriate level and pursuing initiatives like the software university, and the generation of medical spin-outs is also a promising area.

All of these things will require heavy investment, necessitating a programme of borrowing. They also require new public institutions working at arm's length from government and employing people with the requisite skills, experience and drive.

Each of them involves considerable risk and perhaps some stringency in current spending on other public services. Ultimately it is a political question for the people of Wales. Do we want to purse modest sensible policies that will change our situation only very gradually?

Or are we ready to venture something bolder with no certainty of success but some hope of making a faster change in Wales' circumstances? As the financier Bernie Cornfeld put it: "do you sincerely want to be rich?"

Notes

1 *Maximising the Impact of Welsh Procurement Policy*, John F McClelland CBE, August 2012. http://gov.wales/docs/dpsp/publications/valuewales/120917mcclellandreviewfullfinal.pdf

2 Private conversations with the author

3 For example: *The Economic Impact of NHS Procurement: A Study of the Aneurin Bevan Health Board*
Kevin Morgan, Max Munday and Annette Roberts, Cardiff University in Welsh Economic Review, Spring 2012.

4 Maclennan & O'Sullivan (2012) Raising the game – the economic case for housing

5 http://wales.gov.uk/statistics-and-research/housing-need-demand/?lang=en

6 http://wales.gov.uk/topics/housing-and-regeneration/housing-supply/task-force/?lang=en

7 http://chcymru.org.uk/en/publications/weru-report/

8 http://www.scottishfuturestrust.org.uk/our-work/housing/national-housing-trust/

9 http://www.cewales.org.uk/2012/12/the-future-of-welsh-homes-retrofitting-terraced-houses/

10 http://wales.gov.uk/topics/environmentcountryside/energy/efficiency/arbed/?lang=en

11 http://wales.gov.uk/topics/environmentcountryside/energy/fuelpoverty/researchreports/?lang=en

12 *Building the Future: The economic and fiscal impacts of making homes energy efficient* October 2014
http://www.energybillrevolution.org/wp-content/uploads/2014/10/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf

13 http://wales.gov.uk/topics/environmentcountryside/energy/fuelpoverty/?lang=en

14 See, for example: http://www.walesonline.co.uk/business/business-news/cardiff-city-region-metro-system-8821559

Appendix

Re-energising Wales

Re-energising Wales

Introduction

Wales has substantial zero carbon renewable energy resources. Just as the City of London and south east England exploit their comparative advantages of financial muscle, political power and geographical location, we in Wales must leverage our own comparative advantages.

So how can Wales achieve a comparative advantage in renewable energy terms such as we enjoyed when coal was king, Rhondda its workhorse and Cardiff its queen?

WG is committed to an annual decline of 3% in Greenhouse Gas emissions under its control and is party to UK and EU commitments to an 80% decrease in emission by 2040 and other intermediate targets. To meet these targets we need a combination of energy saving and the exploitation renewable energy resources.

This raises an important issue: do we need to plan for incrementally increasing energy demand, or are we currently highly profligate and able to achieve a high living standard at lower total [not just per capita] energy use? Given that Germany and Denmark have targets for decreased total energy use the answer to this must be 'Yes'.

As a first step we need a thorough examination of how to make major energy savings from the space heating, transport, industry and electricity use.

Our sparse population and our planning system has built in an over-dependence on fossil-fuelled cars. A determined effort to increase use of sustainable transport, and for short local journeys Active Travel (walking & cycling), and energy efficient EVs has considerable potential to lower demand. Our housing stock is poorly insulated. Better space insulation in houses and businesses, ground and air source heat pumps as well as technological advances e.g. LED lights and more efficient white goods, can also cut down our energy consumption. These shifts also have a range of positive and productive health and economic benefits.

Based on mainland EU practice, it seems reasonable to target a sustainable total Wales energy demand [based on existing measurements] of 60 - 65 TWh of annual energy by 2025-2030, of which 35-40 TWh would be electricity, allowing some leeway for a more Welsh manufacture and enhanced local food supply chains.

The initial question therefore translates, crudely, into: can Wales generate some 35-40 TWh of renewable electricity and ~25 TWh heat by 2030?

Constraints and Possibilities:

Every potential source of heat and electricity has limitations and problems. But continuing fossil fuel burning is not an option due to the high risk of catastrophic climate change. Since there is no prospect of nuclear fusion being rolled out in time, electricity-generating options are limited. Dominantly these are a range of renewable sources and/or nuclear power. In terms of heat, the main renewable options are solar, biomass/wood, air/ground and water heat pumps in various combinations and aerobic digestion of wastes (AD).

1. Electricity

Renewable sources are dispersed and numerous but have a low energy density and can have a visual and other environmental impacts. Historically the supply pattern, from Central Electricity Generating Board (CEGB) days, is of generation in a few large plants, be they coal, oil, gas or nuclear, and then distribution out to users by the National Grid and local DNO grids. This allowed central control, both technical and fiscal, and was amenable to 'privatization'. Much of this infrastructure is now foreign owned and is ageing. Critically profit, which is largely exported, is related to use and the system is not easily compatible with a push towards energy saving.

Two competing models for electricity generation, distribution and use are emerging. The first retains a 'privatized CEGB model' with international companies building and owning major power-stations and the grid etc. their risk underwritten by government but with citizens being passive-end users and payers. UK Government has a major role in controlling and usually subsidizing, directly or indirectly, the provision cf. high strike price for Hinkley C and the range of subsidies and tax breaks being provided for oil and gas exploration and production, including fracking.

The alternative, while necessarily retaining a significant element of central management to help balance supply and demand on local and continental scale, envisages a new model based on dispersed generation from many renewable sources, mostly locally owned (many communal projects) linked in a series of stacked smart grids. Below the very high voltage grid, these would be municipally owed and run. This model is evolving in Denmark and Germany.

The adoption of this model would be ground-changing for Wales and could have major economic, social and environmental advantages. To succeed would require innovative mechanisms for local funding and changes in ways planning applications are addressed. It would also need robust electricity storage methods and local grid enhancements - but fewer high voltage, visually intrusive developments.

None of the challenges are insurmountable and imaginatively tackled have the potential to provide considerable advantages. Decentrailsing energy production can change the relationship between people and energy, much as people who recycle their waste now think differently about packaging and consumption, which can lead to reduced energy use. Benefits to local economies and skills could also be significant.

For this to work Wales would need enough onshore and offshore renewable energy capacity for internal use i.e. at least 40 TWh of electricity annually from an installed capacity of 6-10 GW depending on load factors achieved. There could be an added economic attraction of an export potential, both of energy and technology, or a capacity to attract enterprises wishing to use reliable zero carbon energy for their businesses.

2. Heat

Space heating, mainly using oil and gas and some coal, electricity and renewables e.g. wood fired stoves, accounts for ~30% of Wales' current energy use [~30TWh].

Given the poor quality of our housing stock and the pervasive fuel poverty in some areas, this is an area where major improvements can be made by better insulation. But Wales has specific problems with a significant proportion of stone and solid brick building and a wet climate creating a propensity for damp and condensation. In many areas cavity wall insulation is not appropriate. That said solutions exist, but require planning guidance that prioritises energy efficiency.

New higher energy efficiency building regulations are required for new build but the majority of Wales' 1.4 million existing homes will still in use in 2040 and most will require retrofitting.

There are a number of potential heat sources to be exploited:

- If the Welsh Government does more to implement its policy to increase woodland cover by 2030/40 we could have a sustainable yield of timber which can be used for heat either in community heating schemes or individual houses. This could contribute ~ 2 to 5 TWh annually.

- Well insulated houses can then be warmed effectively by ground source heat pumps. These pumps require electricity but supply about 3kW of heat per kW of electricity used. Thus at a macro scale 1 TWh of renewable electricity would generate more than 3 TWh of heat: a huge gain compared with an electric fire. Air source heat pumps can also achieve this scale of conversion where insufficient land is available for ground source heat pumps.

- District heating in urban areas, passive solar gain designed into new housing, as well as solar for water heating, and use of methane from AD systems using wastes, all have the potential to contribute.

3. Wales' Renewable energy resources including water:

Sources of renewable energy:

Electricity:

Wind:	—Off shore wind turbines —Terrestrial wind turbines
Solar:	—Photovoltaics
Biomass:	—(Undesirable as it's much more efficient to burn directly for heat - conversion to electricity incurs >60% loss)
Hydro electricity:	—Small sale hydro —Retrofit existing large reservoirs —Small new reservoirs —Pump storage – not net gain but to store surpluses
Marine:	—Tidal lagoons - depend on tidal rise and fall —Tidal flow - essential water mills —Wave energy?
Geothermal:	—[improbable in Wales]

4. Electricity storage

—Pump storage as in Dinorwig and Ffestiniog
—Local battery storage.
—Use of EVs as storage systems.

3.5. Current official estimates:
[not based on a dispersed generation and smart grids model]

WG reports suggest by 2020/25, the potential renewable electricity production:

Wind:	On shore Off shore	2 GW - 5TWh 6 GW - 21TWh
Biomass:		1GW - 7TWh
Tidal:	range i.e. barrage or lagoons stream/wave	8.5 GW - 18TWh 4 GW - 9TWh
Solar:	PV	1 GW - 1TWh
Total:		~54TWh

However the above is based on macro schemes e.g. Severn Barrage (although this capacity can be largely replaced by 3 or 4 Tidal lagoons e.g. Swansea Bay, Upper Severn, Colwyn Bay/Rhyl and maybe Carmarthen Bay) and schemes such as the Rhiannon Wind Farm which is now in abeyance.

Curiously Wales' hydroelectric potential, including existing reservoir infrastructure, is not considered. But note the Hafod y Llan scheme of 320MW has a potential of about 2GWh and many schemes of this size and smaller could be developed with a much lower visual impact than on-shore wind.

Conclusion:

In summary it is very likely, even highly probable, that Wales can be 'renewable energy' self-sufficient and that this can be a transformative asset with a much longer impact than King Coal.

Most agree that energy saving offers a much better return than new energy generation. Currently the full costs of hydrocarbon burning are not included in our fuel bills, indeed the sector is heavily subsidised. Similarly even though the agreed strike price for Hinkley C Nuclear Power station appears high at up to £92.50 per MWh [at 2012 prices inflation proofed]. This price does not include decommissioning cost nor long term storage and protection of radioactive wastes for thousands of years. It appears that the Austrian Government is intending to challenge the implied subsidy. The price sought for Swansea Bay Tidal Electricity is ~£145 per MWh, recognising that this is a pilot scheme.

The priority is to establish a well resourced expert group with a short, maximum 18 month, deadline to come up with a costed and timed, authoritative plan for low carbon re-energised Wales. The group should be based on independent experts taking evidence from practitioners in Wales and elsewhere e.g. Germany, Denmark, California and South Australia where major progress is being made.

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