The Saturday Economist Guide

Modelling UK Investment

July 2014

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Introduction

Recovery in Investment …

In the first quarter of 2014, investment increased by almost 10% compared to the first quarter prior year. The recovery is heralded as a welcome step to rebalance the economy from a consumption based economy, to an investment led economy.

But is this realistic? According to our forecasts, the strong rally in investment is expected to continue. Nevertheless, by the end of 2015, investment will account for just over 15% of GDP compared to 61% for household consumption. The rally in investment is welcome but investment remains some way off the highs of 2007. We have to be realistic about the targets we set for the UK economy.
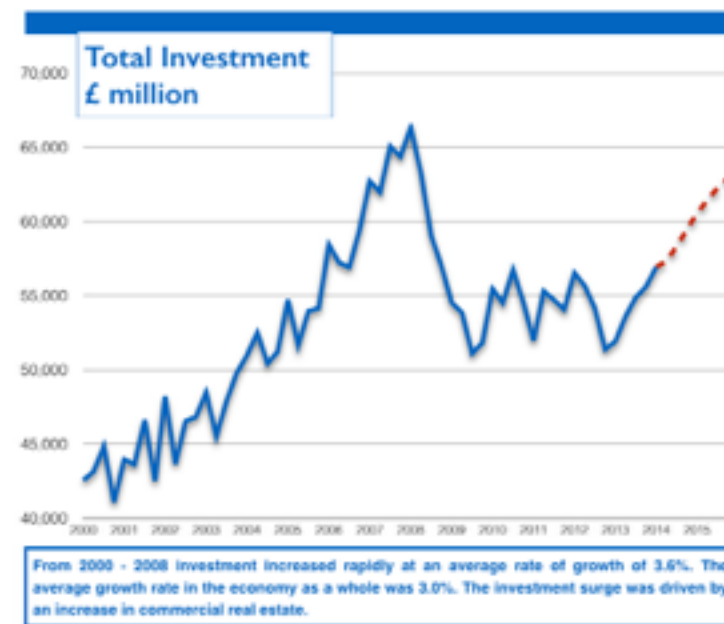
It isn't always about capacity …

Investment isn't always about productive capacity. In 2007, the largest share of investment in the economy was property related. Over 70% of investment is explained by dwellings and commercial real estate investment. Machinery and Equipment, areas of investment we tend to associate with "productive capacity" within the economy, account for just 20% of total investment spending.

It isn't about the cost of capital

The recovery in investment is a function of the recovery within the economy. The forecast horizon is clearing. Businesses can be more confident about the returns and payback calculation over the years ahead. Low interest rates of themselves do not stimulate investment. The cost of capital is a relatively low element in the return on investment model. Recovery is the key to unlocking the growth in investment.

The strong rally in investment is expected to continue …

Total Investment £ million

From 2000 - 2008 investment increased rapidly at an average rate of growth of 3.6%. The average growth rate in the economy as a whole was 3.0%. The investment surge was driven by an increase in commercial real estate.

Summary

In this analysis, we explain our modelling process for UK investment based on a disaggregated model.

Forecasts are generated from survey data on capacity and investment intentions utilising the Manchester Index™. Our capital stock model suggests there is no real loss of productive capacity within the UK following the recession but neither is there rebalancing.

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2 Property Accounts for 70% of total investment …

When modelling investment, it is important to remember that over 70% of investment, identified in the National Accounts, relates to property i.e. dwellings and commercial real estate.

The largest component in investment is commercial real estate. Accounting for 35% of total investment activity, a further 27% relates to investment in dwellings both public and private sector.

Given the collapse of the property market in 2008, we still estimate some 20% of the commercial real estate market was "under water" in 2013 on a LTV, loan to value measure. A further 30% of the property market is above a conventional 65% LTV ratio.

Other sectors

A further 14% is classified as intangible fixed assets and 5% as transport equipment. Approximately 20% is defined as plant and machinery, the major contributor to the concept of "capacity" within the economy.

The fall in investment within the UK economy, is largely explained by the fall in property spending, transport and corporate finance activity.

The actual fall in investment plant and machinery impacting on the loss of capacity tends to be over stated as our capital stock model (section 3) suggests.

70% of investment relates to the property, dwellings and commercial real estate …


Legend:
- Transport Equipment
- Machinery & Equipment
- Dwellings
- Commercial Real Estate
- Intangible Fixed Assets
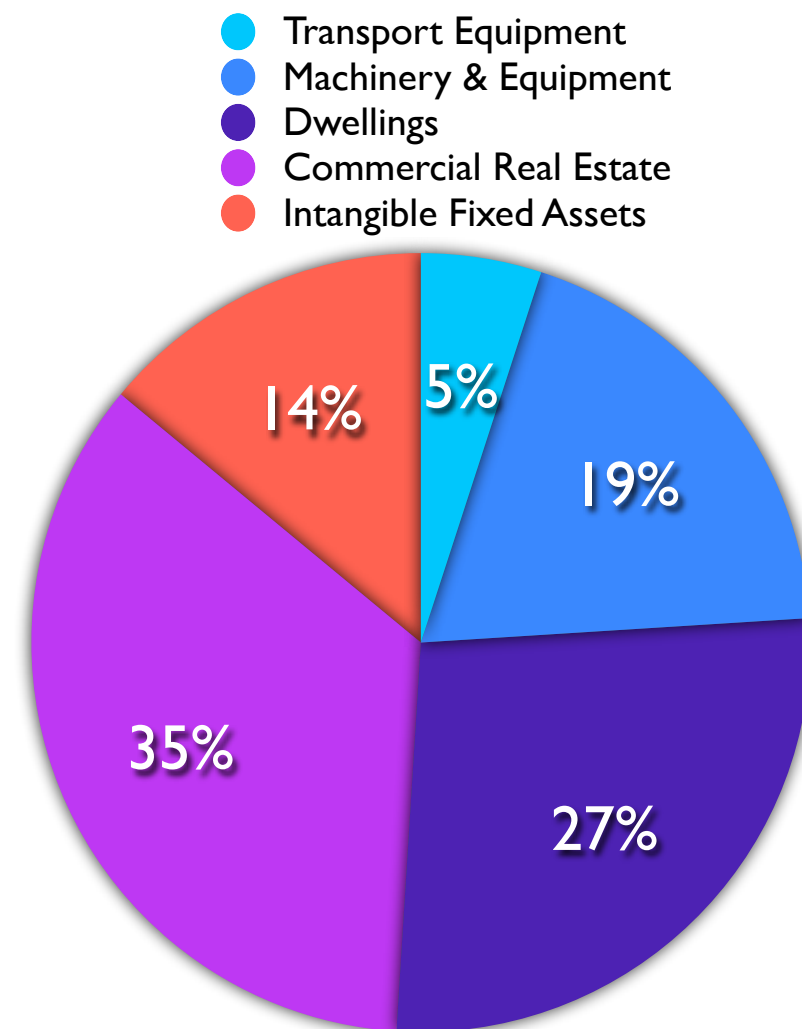
Data Average 1997 - 2012

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3 Productive Capacity .. back to normal by the end of the year …

Our capital stock model suggests productive capacity within the economy will return to normal by the end of 2014. We identify productive capacity as investment in plant and machinery with a four year capital stock model. The model assumes an aggressive four year lifespan of assets, with a four year rolling total identified in the data. Our 10 year model is even more positive about capacity retention.
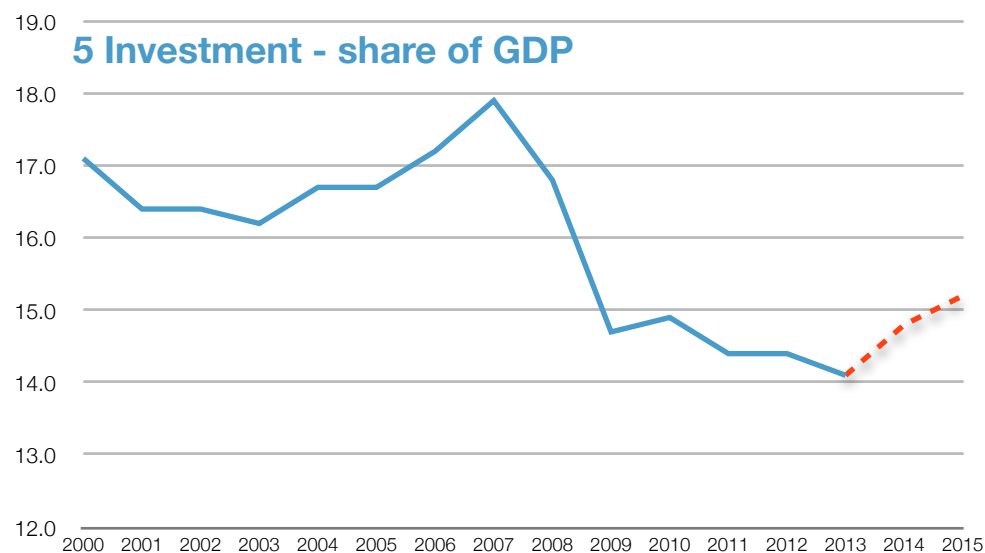
UK Four Year Capital Stock Model £m
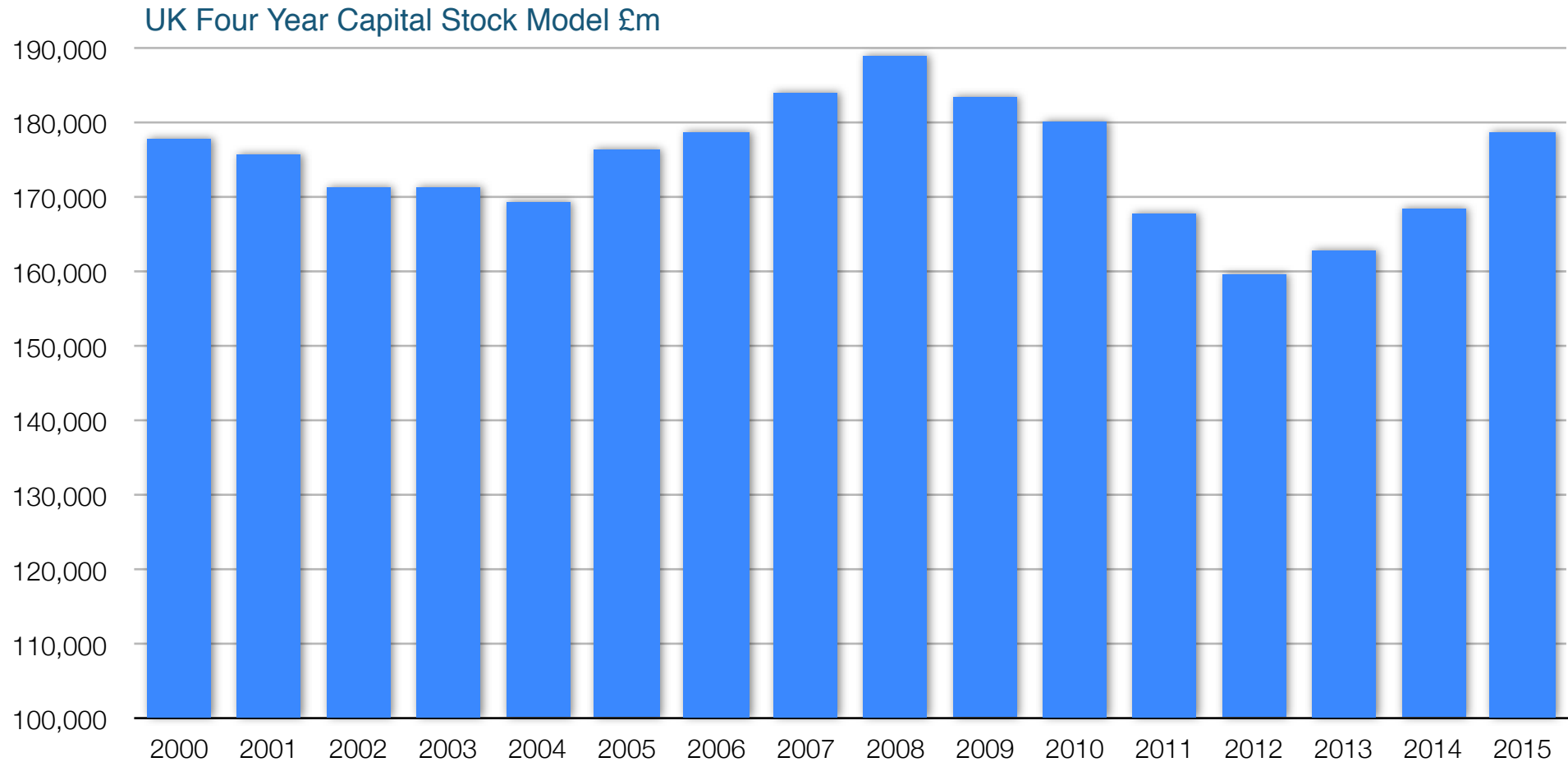
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4 Growth in investment and GDP …

From 2000 - 2008 investment increased rapidly at an average growth rate of 3.6%. The average growth rate in the economy as a whole was 3.0%. The investment surge was driven by an large increase in commercial real estate and "other property" interests.

We are forecasting an increase in investment of 7.4% in 2014 and 6.5% in 2015. Our forecasts for UK growth overall are 3% in 2014 and 2.8% in 2015.

The investment share of GDP is set to increase as a result. This represents recovery rather than re balancing of the economy.

We are forecasting an increase in investment of 7.4% in 2014 and 6.5% in 2015.

	2013				2014				2015			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	-8.2	-3.7	1.4	8.2	9.7	7.0	6.3	7.0	6.4	7.2	6.8	5.7

## 5 Investment - share of GDP

5 Investment share of GDP …

Between 2000 and 2008, investment averaged between 16% and 17% of GDP, rising to almost 18% in 2007. In the recession, the investment ratio fell to almost 14% in 2013.

A large proportion of the fall is explained by the collapse in real estate and property investment. The fall in productive capacity was not as severe as we explain in section 3.
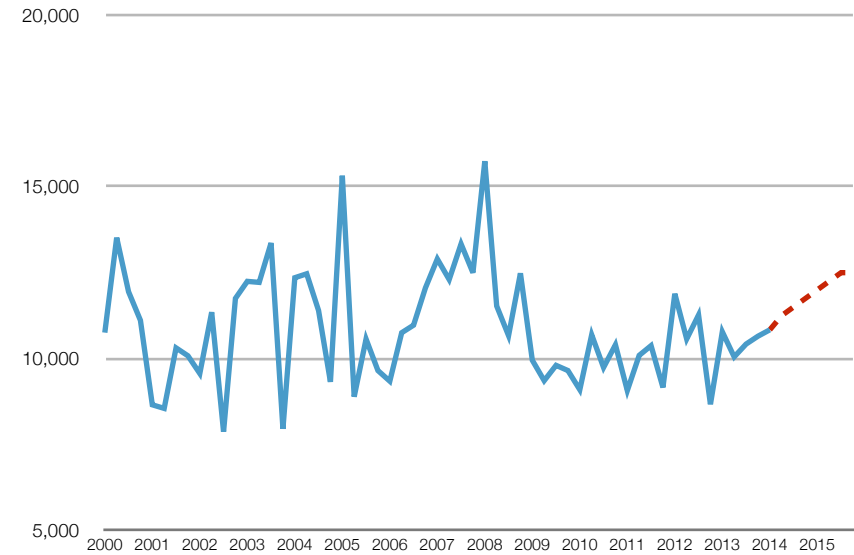
We expect a rally in investment expenditure accounting for over 15% of GDP by 2015. Despite the increase, household expenditure will continue to dominate economic activity in the UK economy.

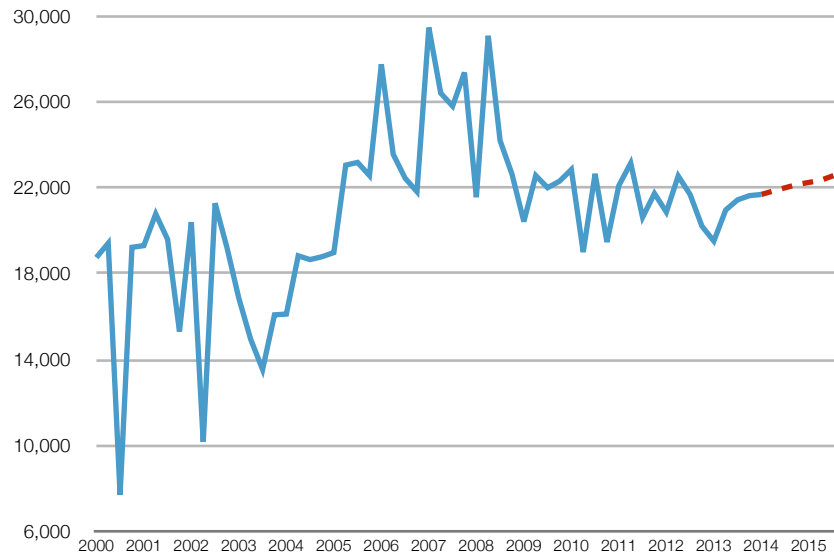# The Saturday Economist - Modelling UK Investment
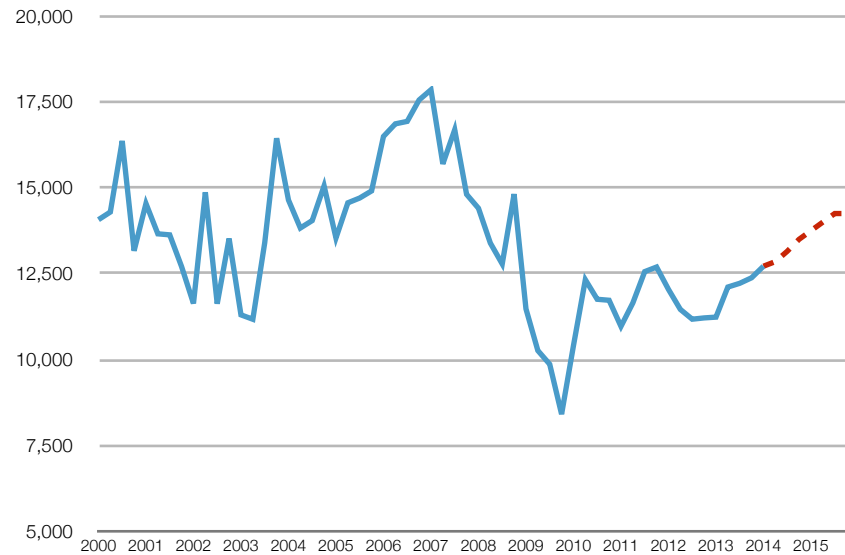
6.1 Business Investment Total £ m
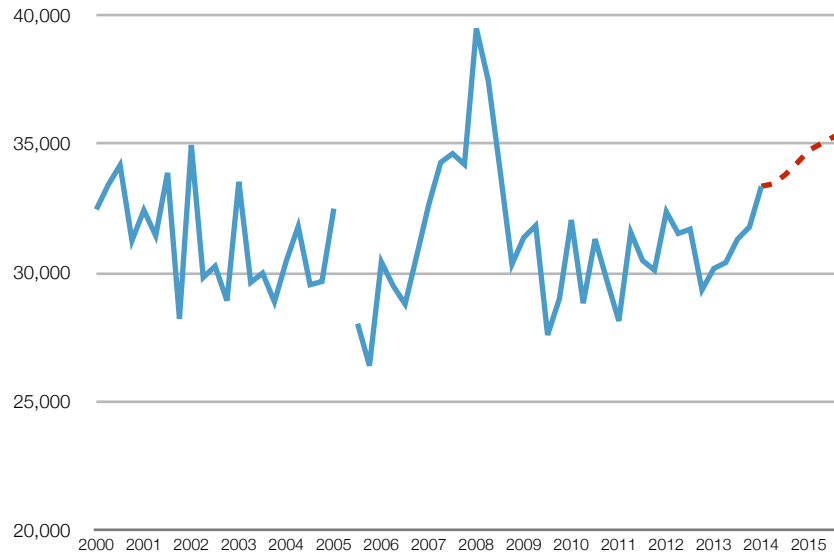
6.2 Plant and Machinery Investment

6.3 Commercial Real Estate £m

6.4 Private Sector Dwellings £m

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7 Disaggregated model …

Plant and Machinery …

Our disaggregated model assumes significant growth in plant and machinery investment, (6.2). This is mirrored in the forecast model using capacity and investment intentions model derived from survey data.

Housing and Commercial Real Estate …

The strength of the housing market suggests significant growth in private sector dwelling investment (6.4) but more modest recovery in commercial real estate (6.3) over the short term.

Transport …

Transport is set for a strong recovery given the under investment over the past three years (6.5). Investment in transport equipment averaged £3.5 billion per quarter in the period 2001 to 2010. A recovery from the low in Q3 2012 is evident. We are projecting a strong rally to pre recession norms over the forecast period.

Corporate Finance ..

The significant advance in corporate finance activity at present, (IPOs, M&A) suggest growth in ownership transfers and intangible fixed asset investment will increase over the next two years. Given the strong performance in Q1, we may have under forecast growth in this sector (6.6). The rally in the corporate finance market may lead to greater growth in investment over and above the levels currently within the model.

6.5 Transport Equipment …
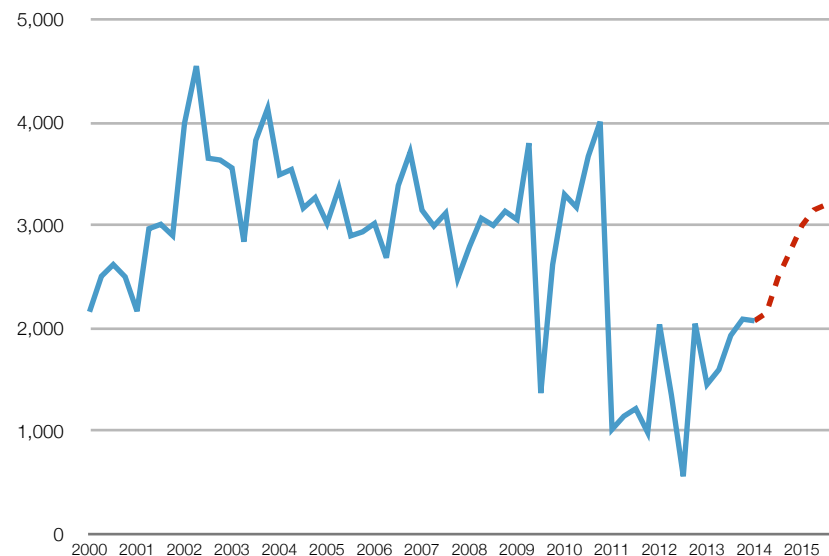
6.6 Corporate Finance Related …
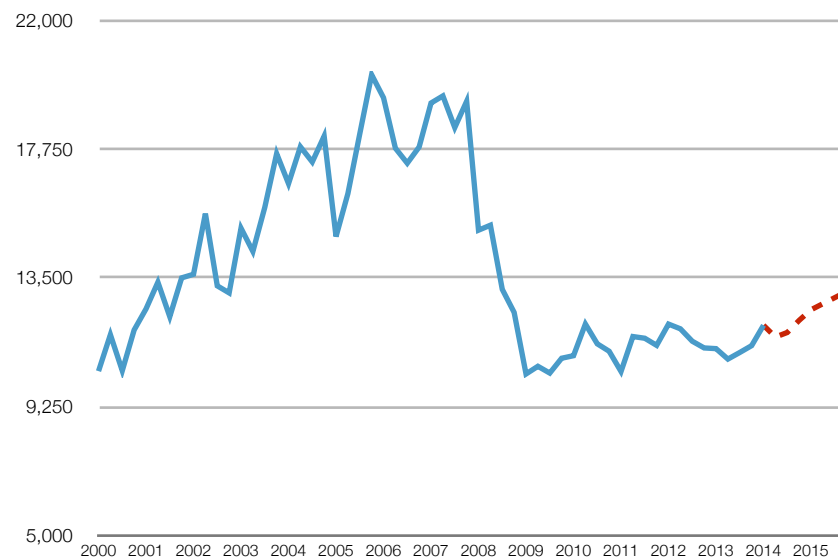
8 Capacity and Investment Intensions ... The Manchester [Investment[Index™
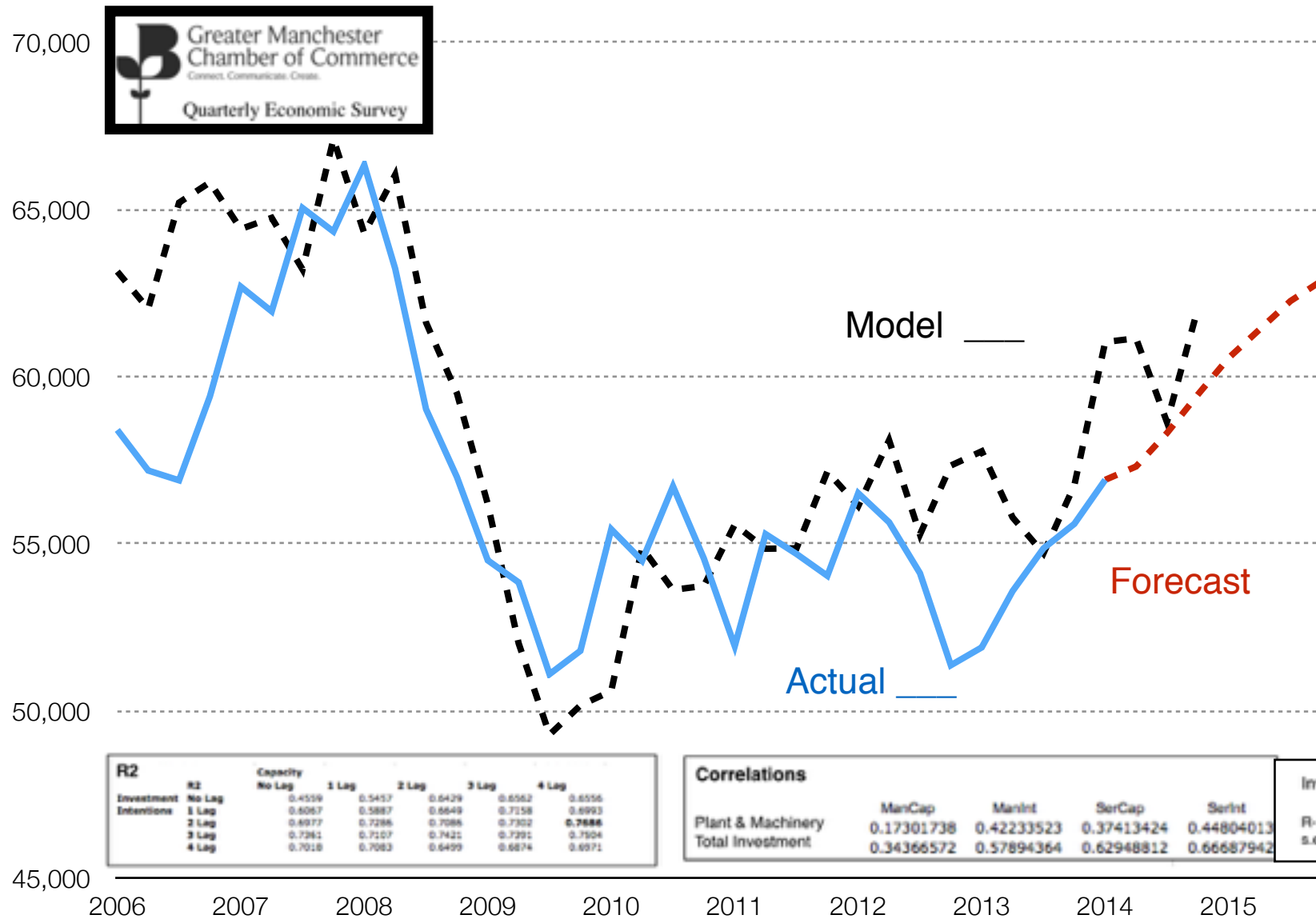
Using data from GM Chamber of Commerce QES data, we model investment as a function of capacity utilisation and investment intentions.

We lag capacity by 4 quarters and investment intensions by 2 quarters.

Highest correlations identified in the lag structure generate a R2 value of 0.9122 for our model.

The disaggregated model discounts the more optimistic Manchester Index™ model.

Model ___

Forecast

Actual ___

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9 Conclusions

1 Investment is increasing but the economy is not rebalancing …

In the first quarter of 2014, investment increased by almost 10% compared to the first quarter prior year. The rally in investment is welcome but investment remains some way off the highs of 2007. By the end of 2015, investment will account for just over 15% of GDP compared to 61% for household consumption. The economy is not rebalancing

2 Investment isn't always about productive capacity …

In 2007, the largest share of investment was property related. Over 70% of investment is explained by dwellings and commercial real estate investment. Machinery and equipment, areas of investment we tend to associate with "productive capacity", account for just 20% of total investment spending.

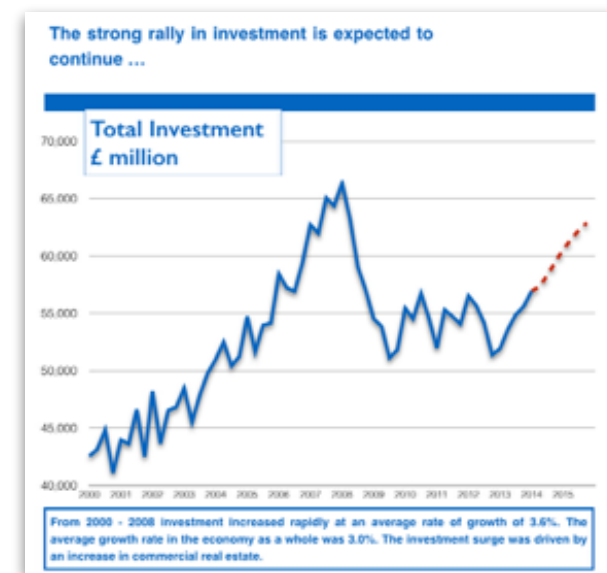### 3 There has been no significant loss to productive capacity …

Our capital stock model suggests productive capacity within the economy will return to normal by the end of 2014. We identify productive capacity as investment in plant and machinery with a four year capital stock model. There has been no significant loss to productive capacity and output potential

4 Low interest rates of themselves do not stimulate investment …

The cost of capital is a relatively low element in the return on investment model. Recovery is the key to unlocking the growth in investment.

5 Investment will assist not lead the recovery …

We are forecasting an increase in investment of 7.4% in 2014 and 6.5% in 2015. Our forecasts for UK growth overall are 3% in 2014 and 2.8% in 2015. The investment share of GDP is set to increase as a result. This represents recovery rather than re balancing of the economy. Investment will assist, not lead, the recovery.

The strong rally in investment is expected to continue …

Total Investment £ million

From 2000 - 2008 investment increased rapidly at an average rate of growth of 3.6%. The average growth rate in the economy as a whole was 3.0%. The investment surge was driven by an increase in commercial real estate.

"Investment is increasing but the economy is not rebalancing"

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10 Detailed Forecasts - June Economic Outlook Updated (July)

Gross fixed capital formation by sector and type of asset (£million at chained volume measures (reference year 2010) seasonally adjusted)

	Analysis by sector						Analysis by asset						
	General government	Public corporations (2) Dwellings (3)	Public corporations (2) Costs of transfer of ownership of non-produced assets	Private sector Dwellings (3)	Private sector Costs of transfer of ownership of non-produced assets	Total	Transport equipment	Other machinery & equipment	Dwellings (3)	Other buildings & structures (4)	Intangible fixed assets	Total	
	DLWF	L634	L635	L636	L637	NPQT	DLWL	DLWO	DFEG	DLWT	EQDO	NPQT	
2010	36,572	4,257	-390	46,203	12,661	221,156	14,155	39,921	50,444	83,977	32,659	221,156	2010
2011	32,884	4,024	-346	47,860	11,233	215,918	4,379	38,689	51,706	87,613	33,531	215,918	2011
2012	33,256	2,798	-360	45,882	11,109	217,595	6,003	42,389	48,596	85,314	35,291	217,595	2012
2013	30,280	2,858	-389	47,939	11,565	215,890	6,995	41,894	50,718	83,553	32,730	215,890	2013
2014	29,640	2,956	-375	52,216	12,660	231,951	9,478	45,336	54,820	87,689	34,628	231,951	2014
2015	33,500	3,000	-400	56,250	14,200	247,050	12,600	49,250	58,500	89,900	36,800	247,050	2015
rate of change													
2010	-1.0%	0.1%	8.3%	15.5%	8.1%	2.8%	30.5%	3.0%	14.0%	-3.8%	7.4%	2.8%	2010
2011	-10.1%	-5.5%	-11.3%	3.6%	-11.3%	-2.4%	-69.1%	-3.1%	2.5%	4.3%	2.7%	-2.4%	2011
2012	1.1%	-30.5%	4.0%	-4.1%	-1.1%	0.8%	37.1%	9.6%	-6.0%	-2.6%	5.2%	0.8%	2012
2013	-8.9%	2.1%	8.1%	4.5%	4.1%	-0.8%	16.5%	-1.2%	4.4%	-2.1%	-7.3%	-0.8%	2013
2014	-2.1%	3.4%	-3.6%	8.9%	9.5%	7.4%	35.5%	8.2%	8.1%	5.0%	5.8%	7.4%	2014
2015	13.0%	1.5%	6.7%	7.7%	12.2%	6.5%	32.9%	8.6%	6.7%	2.5%	6.3%	6.5%	2015
2010Q1	9,459	1,014	-80	10,403	2,580	55,422	3,300	9,092	11,826	22,850	8,354	55,422	2010Q1
2010Q2	8,868	1,171	-105	12,323	3,411	54,481	3,177	10,691	13,042	19,003	8,568	54,481	2010Q2
2010Q3	9,225	1,077	-106	11,753	3,452	56,706	3,671	9,739	12,771	22,651	7,874	56,706	2010Q3
2010Q4	9,020	995	-99	11,724	3,218	54,547	4,007	10,399	12,805	19,473	7,863	54,547	2010Q4
2011Q1	9,022	1,075	-87	10,964	2,827	51,926	1,020	9,067	12,151	22,102	7,586	51,926	2011Q1
2011Q2	7,819	1,072	-94	11,646	3,264	55,278	1,148	10,091	12,587	23,150	8,302	55,278	2011Q2
2011Q3	8,219	989	-78	12,558	2,525	54,684	1,221	10,374	13,477	20,627	8,985	54,684	2011Q3
2011Q4	7,824	888	-87	12,692	2,617	54,030	990	9,157	13,491	21,734	8,658	54,030	2011Q4
2012Q1	8,536	729	-106	12,041	2,937	56,502	2,039	11,887	12,668	20,868	9,040	56,502	2012Q1
2012Q2	9,163	718	-87	11,458	2,858	55,632	1,353	10,569	12,197	22,550	8,963	55,632	2012Q2
2012Q3	7,979	690	-80	11,173	2,657	54,108	564	11,267	11,835	21,687	8,755	54,108	2012Q3
2012Q4	7,578	661	-87	11,210	2,657	51,353	2,047	8,666	11,896	20,209	8,533	51,353	2012Q4
2013Q1	7,096	680	-109	11,233	2,824	51,887	1,394	10,778	11,857	19,515	8,343	51,887	2013Q1
2013Q2	7,662	735	-79	12,109	2,751	53,571	1,611	10,047	12,876	20,966	8,071	53,571	2013Q2
2013Q3	7,780	723	-97	12,218	2,920	54,849	1,974	10,420	12,897	21,438	8,120	54,849	2013Q3
2013Q4	7,742	720	-104	12,379	3,070	55,583	2,016	10,649	13,088	21,634	8,196	55,583	2013Q4
2014Q1	7,140	706	-75	12,716	3,060	56,901	2,078	10,836	13,420	21,689	8,878	56,901	2014Q1
2014Q2	7,250	750	-100	12,850	3,100	57,300	2,150	11,250	13,600	21,850	8,450	57,300	2014Q2
2014Q3	7,500	750	-100	13,150	3,200	58,300	2,500	11,500	13,800	22,000	8,500	58,300	2014Q3
2014Q4	7,750	750	-100	13,500	3,300	59,450	2,750	11,750	14,000	22,150	8,800	59,450	2014Q4
2015Q1	8,000	750	-100	13,750	3,400	60,550	3,000	12,000	14,250	22,250	9,050	60,550	2015Q1
2015Q2	8,250	750	-100	14,000	3,500	61,400	3,150	12,250	14,500	22,350	9,150	61,400	2015Q2
2015Q3	8,500	750	-100	14,250	3,600	62,250	3,200	12,500	14,750	22,550	9,250	62,250	2015Q3
2015Q4	8,750	750	-100	14,250	3,700	62,850	3,250	12,500	15,000	22,750	9,350	62,850	2015Q4

11 Notes on investment models

Notes on Investment Models : Saturday Economist

1 Survey Model ; The Manchester Index

Our model is derived from the GM Chamber of Commerce Quarterly Economic Survey "Manchester Investment Index". Data is derived from capacity and investment intentions in the manufacturing and service sectors. Highest correlations and predictive fit are derived from capacity (-4) lagged by four quarters and investment intentions (-2) lagged by two quarters.

The model over predicts overall investment, we assume this is because of the current state of over investment in commercial real estate. A better performance is obtained when forecasting "Business Investment". The model is similar but an enhancement to model 6 in the Bank of England suite of investment models identified in Burgess et al (2013).

2 ARIMA and Box Jenkins Model

We also use a conventional ARIMA and Box Jenkins models forecasting investment as a function of lag dynamics. [See Section 2]

3 A disaggregated Model

A disaggregated model accepts that over investment in the commercial real estate market may have a significant overhang in the resumption of our long term [I (f) Y] relationship. Reflecting a Hyman Minsky distortion.

4 Cost of Capital and Forecast Horizon

Our model accepts that cost of capital is a relatively low factor in the investment payback calculation and the investment decision process. Relative certainty of demand over the forecast horizon is a key factor in the investment decision. Akin to the confidence fairy proposition, reflected in Krugman 2010, Bloom, 2009, MacCafferty 2014

5 Disaggregated Pattern recognition

Our models are reconciled with a "pattern recognition" of the forecast outlook for the disaggregated variables before final model build and projection is made.

The Bank of England Investment Models.

According to Burgess et al, 2013, there are seven models in the Bank of England Model investment suite, described below. Figure 8 shows a comparison of the forecasts from these seven models.

1. ARMA model: A simple baseline model, expressing business investment as a function of lag dynamics (see Box et al. (1970)).

2. Simple financial accelerator model: An ECM which assumes that in the long run, the level of investment depends on the level of GDP, the capital stock and the cost of capital, but that in the short run, financial channels such as firms' cash flow, interest payments and net financial assets play an important role.

3. Gearing model: An ECM, which assumes that in the long run, investment is determined by GDP, the cost of capital and the "gearing disequilibrium: "the extent to which firms' debt levels are away from a target" level determined by tax incentives and the risks of distress (Bunn and Young (2004)).

4. Money, lending and investment system: A three-equation VECM which jointly models business investment, non-financial companies' money holdings and M4 lending to non-financial companies. A range of other explanatory variables are included, such as spare capacity and firms' retained earnings. See Brigden and Mizen (1999)

5. Tobin's Q model: A model for the ratio of investment to the capital stock, which in the long run depends on a proxy for Tobin's Q, the value of the firm. (see Kapetanios et al. (2006)).

6. Survey model: This uses the investment intentions balances in the BCC Quarterly Economic Survey to project investment in the year ahead.

7. VECM: A four-equation system embodying two assumed long-run relationships. One relates investment to the size of the capital stock; the other is based on a profit-maximising condition and links the capital-output ratio to the real cost of capital. See Ellis and Price (2004).

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