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Property price misalignment with fundamentals in Malta

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WP/03/2016

[1] Mr Micallef is the Manager of the Research Office of the Central Bank of Malta. Helpful comments and suggestions by Dr Aaron G Grech, Alfred Mifsud, Crt Lenarcic and John Caruana are gratefully acknowledged. The views expressed in this paper are those of the authors and do not necessarily reflect those of the Central Bank of Malta. Any errors are the author's own.

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Abstract

This paper computes an aggregate 'misalignment' index using a multiple indicator approach to identify under or over-valuation of house prices in Malta based on fundamentals. A total of 5 indicators are used that capture demand, supply and banking system factors: the house price-to-RPI ratio, the price-to-income ratio, price-to-construction costs ratio, dwelling investment-to-GDP ratio and the loan-to-income ratio. These indicators enter the index in 'gap' form, that is, as a deviation from their trends or long-run averages. The weights are derived using principal component analysis. Based on the Central Bank of Malta house price index, the misalignment indicator shows a period of overvaluation in house prices that peaked in 2006-2007. This disequilibrium started to be corrected following the decline in house prices, reaching a trough in 2013. Starting in 2014, however, the index started to recover such that, by end-2015, house prices were broadly in equilibrium.

JEL classification: C43, C55, E31

Keywords: multiple indicator, house prices, housing market, valuation, Malta.

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1. Introduction

Developments in house prices are important for the assessment of the overall business cycle. For instance, in the period preceding the financial crisis, booming house prices in some countries were accompanied by rising private sector indebtedness and unsustainable growth in the construction industry. In the subsequent bust, the drop in house prices reduced collateral values, leading to an increase in non-performing loans, a weakening in the banks' balance sheet and a decline in credit growth. In addition, excessive growth in house prices may lead to additional distortions in the economy, such as a misallocation of resources from productive sectors to the non-tradable sector, which in part explains the weak productivity growth experienced by some countries after the crisis.

The housing sector affects the business cycle through a number of channels.[2] First, house prices affect private consumption through their impact on household wealth. For instance, housing wealth accounts for around 60% of total household wealth in the euro area and therefore, can have substantial effects on households' consumption, investment and portfolio decisions (ECB, 2006). Second, developments in real estate prices affect housing investment and the construction industry, which tend to have a relatively high multiplier effect (Cassar, 2015). Finally, these channels tend to be reinforced via the financial accelerator effect, given the role of real estate as collateral, thereby also affecting the banks' balance sheet and their willingness to extend credit to the real economy (Bernanke et al, 1999; Iacovello, 2005).

In addition to these economic considerations, a better understanding of the state of the house price cycle is also important from a financial stability perspective. Macro-prudential policies are intended to prevent the build-up of risks in the financial sector, including those originating from the property sector, and their spillovers to the real economy. According to the IMF, house price busts occur less frequently than equity price busts but last nearly twice as long and are associated with output losses that are twice as large, reflecting greater effects on consumption and the banking system, which are usually heavily exposed to real estate.[3]

Against this background, this note documents recent developments in the real estate market using a multiple indicator approach to identify under or over-valuation of house prices in Malta. This methodology has become increasingly popular in recent years. UBS (2012) applies a multiple indicator approach for the housing market in Switzerland, with the same methodology being subsequently used to assess real estate prices in the largest global cities. Similarly, Lenarcic and Damjanovic (2015) and Schneider (2013) apply a similar methodology for Slovenia and Austria, respectively. For the purposes of constructing a misalignment indicator for Malta, a total of 5 indicators are used that capture demand, supply and banking system factors. The house price-to-RPI ratio and the price-to-income per capita ratio represent the demand side, price-to-construction costs ratio and dwelling investment-to-GDP ratio represent the supply side, while the loan-to-income ratio captures the banking system perspective. The indicators enter the index in 'gap' form, that is, as a

[2] See Mishkin (2008) on the main transmission channels.
[3] According to IMF (2003), equity price busts are found to occur on average every 13 years, last for 2.5 years and are associated with GDP losses of around 4% of GDP.

deviation from their trends or long-run averages. The weights of the sub-components in the overall index are derived using principal component analysis. The analysis is performed on both the Central Bank of Malta (CBM) and National Statistics Office (NSO) house price indices, which are based on advertised and contract prices, respectively.

The main findings are summarized as follows. The misalignment indicator based on the CBM house price index shows a period of overvaluation in house prices that peaked in 2006-2007. This disequilibrium started to be corrected following the decline in house prices, reaching a trough in 2013. Starting in 2014, however, the index started to recover such that, by end-2015, house prices were broadly in equilibrium. On the contrary, given that the NSO index lags behind the CBM index by around one year, the analysis based on the NSO index suggests that the undervaluation gap remains more pronounced as at end-2015.

The rest of the note is organized as follows. Section 2 provides a selective review of the literature on the subject. Section 3 reviews the main developments in the Maltese housing market since 2000, focusing on both demand and supply factors. Section 4 describes the sub-indices and the overall misalignment indicator. Section 5 provides some sensitivity analysis by comparing the misalignment index with alternative valuation measures derived from statistical filtering techniques. Section 6 concludes and provides avenue for further research.

2. Brief literature review

The property price cycle and its impact on both the macroeconomy and the financial system has received a lot of attention from both academia and policy institutions after the global financial crisis. Studies estimate the real estate cycle, which cannot be observed directly, using both statistical and econometric techniques.

The present value literature calculates the fundamental price of housing by discounting the expected future returns from rental income and compares it to the market house prices. The user cost method compares the expenditures associated with home ownership to rents. The factors typically considered in the user cost of housing include the interest costs, property tax payments (less any deductibles interest and tax payments from taxable income), maintenance costs, risk premia and expectations about future changes in house prices (Himmelberg et al, 2005). In equilibrium, the user cost of housing should be equal to the rental costs as any difference between the two is arbitraged away.

Most of the academic literature applies a broad range of econometric methodologies to determine equilibrium house prices. Igan and Loungani (2012) estimates the equilibrium level of house prices using both demand and supply variables for a large sample of advanced and emerging economies using a reduced form regression. They find that long-run price dynamics are mostly driven by local fundamentals, such as income and demographics but credit market conditions can cause short-run deviations from this equilibrium. Gattini and Hiebert (2010) use a vector error correction model (VECM) with four variables – house prices, housing investment, disposable income per capita and interest rates – to estimate equilibrium house prices in the euro area. The latter approach can also be

used for forecasting and the identification of structural shocks. The Deutsche Bundesbank (2013) estimates fundamental residential property prices for Germany using panel regression analysis. Dreger and Kholodilin (2013) propose an early warning system to identify speculative bubbles in house prices using different approaches, including logit and probit models. Gerdesmeier et al. (2012) applies a quantile regression model to detect booms and busts in the housing market, pointing to possible non-linear effects. Other approaches used within this vast literature also include the use of Markov switching models (Schaller and van Norden, 2002) and state-space models (Kizys and Pierdzioch, 2009).

A number of studies apply statistical methods to identify the house price cycle. For instance, Runstler and Vlekke (2016) apply a multivariate structural time series model to estimate the trend and cyclical components of real GDP, real credit and real residential property prices for the US and the five largest economies in the EU. Similarly, Schuler, Hiebert and Peltonen (2015) characterise the financial cycle using multivariate and time-varying approaches. Other studies rely on univariate de-trending techniques, such as turning point analysis (Claessens et al., 2011, 2012), univariate band-pass filters (Aikman et al., 2015) or a combination of both (Drehmann et al., 2012).

All of the techniques used to estimate fundamental prices are subject to substantial uncertainty. The conclusion is however more reliable when a number of different indicators coincidentally point to the same direction. In its Financial Stability Review, the ECB publishes a misalignment indicator for residential property in a number of euro area countries (ECB, 2011). This indicator is based on four different measures, namely, the house price-to-rent ratio, the house price-to-income ratio, a demand equation approach and an asset pricing approach. Similarly, Kulikauskas (2016) uses several statistical indicators (price-to-rent ratio, price-to-income ratio, univariate Hodrick-Prescott filter) and estimates from an equilibrium equation to assess house price misalignments in the Baltic countries.

The multiple indicator approach uses a number of indicators to capture both the demand and supply side of the property market, with the individual indicators being weighted and aggregated in a single index. UBS (2012) has been calculating the “UBS Swiss Real Estate Bubble Index” since 2011 in order to identify risks and imbalances in the Swiss housing market. The UBS index consists of six sub-indices that track the following ratios: house prices-to-rent, house prices-to-household income, house prices-to-inflation, mortgage debt-to-income, construction activity to gross domestic product (GDP) and loan applications for rental properties to total loan applications. Recently, the UBS index has been extended to track the risk of property price misalignment in the global financial centres. Similarly, Schneider (2013) and Lenarcic and Damjanovic (2015) develop similar misalignment indices based on seven sub-indicators representing the fundamentals driving the housing market in Austria and Slovenia, respectively. In both cases, the sub-indices are chosen to cover the perspectives of households and investors, as well as the banking sector wide factors.

3. An overview of house price developments in Malta: 2000-2015

This section provides an overview of the Maltese housing market since 2000 in order to put the subsequent quantitative method in perspective.[4]

Based on the CBM house price index, residential property prices in Malta increased rapidly in the early 2000s with double-digit growth rates registered between 2003 and 2005. The boom in property prices peaked in 2004, after which the growth rate in house prices gradually slowed down though it remained positive until late 2007 (see Figure 1). As in other countries, house prices declined in 2008 and 2009, partly correcting the previous excesses. The drop was, however, relatively mild, averaging just under 4% per annum over these two years and was followed by relatively low growth between 2010 and 2012. Property prices started to recover in 2013, exceeding the pre-crisis peak in early 2014. Subsequently, house prices maintained strong and positive momentum, averaging 6.6% per annum between 2014 and 2015.

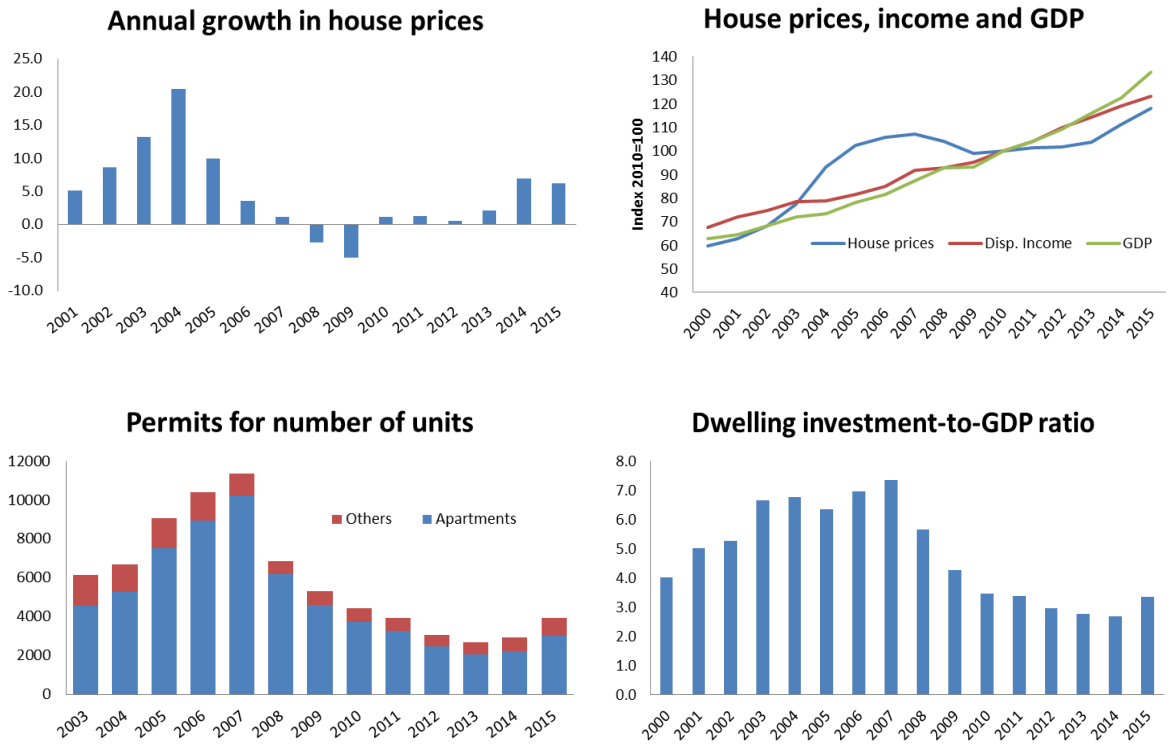

Figure 1: Main developments in the housing sector

Source: Central Bank of Malta, Eurostat, author's estimates

The boom in house prices in the early 2000s was due to a combination of demand and supply factors. Malta's membership in the European Union in 2004 may have influenced expectations about future

[4] The Maltese housing market is characterised by a high degree of home ownership. According to the Survey on Income and Living Conditions (SILC), the degree of home-ownership in Malta stood at 80% in 2014, with only a quarter of these having a mortgage loan, although the share of the latter has been increasing over time. The share of tenants stood at 20% in 2014, although a very high proportion of these pay subsidized rents. However, the share of households paying the market price for rent has been rising in recent years.

economic prospects, while the entry in the ERM II mechanism, two years prior to the adoption of the euro, led to a gradual convergence of domestic interest rates to those set by the European Central Bank. Bank lending rates to households for mortgages declined from around 6.6% in early 2000 to 4.3% by end-2004 following the monetary easing by the European Central Bank in the early 2000s. Low interest rates had a positive effect on property prices, with residential mortgage debt increasing from only 14.5% of GDP in 2000 to 35.0% of GDP in 2007.

A supporting factor for domestic property prices was the Investment Registration Scheme, a tax amnesty for Maltese residents with overseas assets that was effective between 2001 and 2005. This allowed the legalization of previously undeclared income from overseas assets once declared and repatriated to Malta. Many residents took advantage of this scheme and, in the context of the low interest rate environment prevailing at the time, often invested these assets in domestic property. In addition, property development was further encouraged by the rationalization exercise in 2006 by the Malta Environment and Planning Authority (MEPA). The rationalization consisted in the relaxation of height limitations and the inclusion of parcels of land in development zones.

The combination of these policies encouraged construction. For instance, the number of development permits for new dwellings units, mostly apartments, almost doubled between 2003 and their peak of 11,343 in 2007. Similarly, the share of dwelling investment in GDP peaked at 7.4% in 2007, up from 4.0% in 2000. The increase in supply co-existed with a sharp increase in the number of vacant dwellings. According to the 2005 census, the number of dwellings increased to 192,314 units in 2005, an increase of 24% compared to a decade earlier. Of these, vacant properties amounted to 27.6% of the total housing stock in 2005 (53,136 units), an increase of 49% compared to 1995.

The decline in house prices during the crisis was a global phenomenon caused by over-investment in construction in the pre-crisis years. However, compared to other European economies which had experienced excessive increases in house prices before the crisis, such as Ireland and Spain, the correction in domestic property prices was moderate in Malta.

The slowdown in the construction sector, together with the decline in price, is attributable to a number of factors, mostly supply-related. For instance, despite the small size of the market, the 2005 census showed a high share of vacant properties. House price appreciation in earlier years encouraged owners of large houses to develop their properties into apartments that were relatively small and of a lower standard than those generally demanded by the market.

The adjustment in housing market affected both prices and quantities. The number of permits for new units collapsed by more than 50% between 2007 and 2009, reaching a trough of 2,705 units in 2013. Similarly, investment in housing declined from its peak of 7.4% of GDP in 2007 to 2.8% in 2013. House prices declined in 2008 and 2009, followed by a period of sluggish growth until 2012.

Following a correction that lasted around five to six years, the housing market started to recover in 2013, with property prices registering healthy growth rates in 2014 and 2015. In addition to the robust economic growth and the drop in unemployment to historical lows, the increase in house prices is also

attributable to targeted government policies aimed at stimulating the property market. Malta's Individual Investor Programme (IIP) targets high net worth individuals, raising demand for high-end properties.[5] Other measures include another investment registration scheme in 2014, the exemption of stamp duty for first-time buyers on the first €150,000 of their new property value and the reform of the capital gains tax (CGT) in 2015, with the introduction of a final withholding tax system based on the value of the property. Portfolio rebalancing by investors into the housing market could also have played an increasingly important role, especially in the context of the prevailing low interest rate environment.

In addition, social and demographic factors are also having an important impact on the housing market. Ageing and changes in the traditional family nucleus, brought about, for instance, by the introduction of divorce or the increase in single-parent families inevitably raises the demand for housing.[6] Similarly, the influx of foreign workers, which increased from around 1% of the workforce at the time of Malta's EU membership in 2004 to more than 10% a decade later, also had a positive impact on demand. In addition to its impact on house prices, the latter phenomenon has also spurred demand for the rental market, especially in regions in the proximity of main hubs for tourism and fast-growing industries, such as remote gaming and the financial sector.

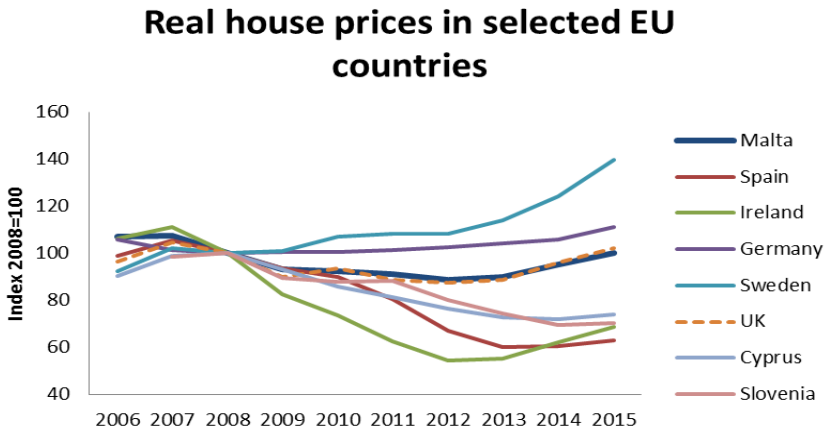

Figure 2: House price developments in selected EU countries

Source: Eurostat, Central Bank of Malta, author's calculations

Finally, Figure 2 compares the developments in Malta's real house prices with those of other EU countries. As expected, there is a high degree of heterogeneity among EU countries, reflecting country-specific characteristics of the housing market. In 2015, real house prices in Malta had returned to their 2008 levels, though they remained lower than their peak of 2006-2007. House prices

[5] IIP applicants are required to make an investment in property of at least €350,000 or enter a property rental contract for at least €16,000 per annum, both on five-year contracts

[6] According to SILC, there were 26,410 one person households in 2005 and 3,610 single parent households. By 2014, one person households were up to more than 37,000 while single parent households had increased by another 3,000.

were still between 20% and 40% lower compared to 2008 in those countries that suffered from an unsustainable boom in construction before the crisis or were severely affected by the crisis (e.g. Ireland, Spain, Cyprus and Slovenia). The UK witnessed a correction in house prices after the crisis but experienced a strong recovery in recent years such that, by 2015, property prices had reached their pre-crisis peak. In Germany, which did not register a boom in house prices before the crisis, property prices stood around 11% higher in 2015 compared to the level prevailing in 2008. Finally, the housing market in Sweden remained on a strong upward trajectory, with real property prices in 2015 standing around 40% higher compared to 2008. This cross-country comparison suggests that the increases in Malta's real house prices in recent years was not excessive, especially given the strong economic performance, with Malta registering one of the highest GDP growth rates in the EU.

4. The misalignment indicator & sub-indicators

Based on the above information, this section looks at the main indicators used in the construction of a 'misalignment' indicator to identify under or over-valuation of house prices in Malta. The index is based on 5 indicators that represent the fundamentals driving the housing market, covering demand and supply factors, as well as one indicator representing a banking system-wide perspective.

The following two indicators were used to capture demand factors:

Price-to-RPI ratio: the real residential property price index is the indicator that most clearly summarizes housing market developments in Malta. Figure 3 refers to the CBM house price index which is based on advertised prices. The real index is obtained by deflating the nominal index by the retail price index (2010=100). The index is linearly de-trended to derive the price-to-RPI gap.

Price-to-income per capita ratio: this measure gives a better insight of the households' purchasing power needed to buy a residence and hence, is considered as a measure of affordability. In the absence of official data, CBM estimates of households' disposable income are used as the measure of income.[7] The latter is divided by the population to account for demographic changes. The gap is derived as the percentage deviation from the long-term mean over the period 2000-2015.

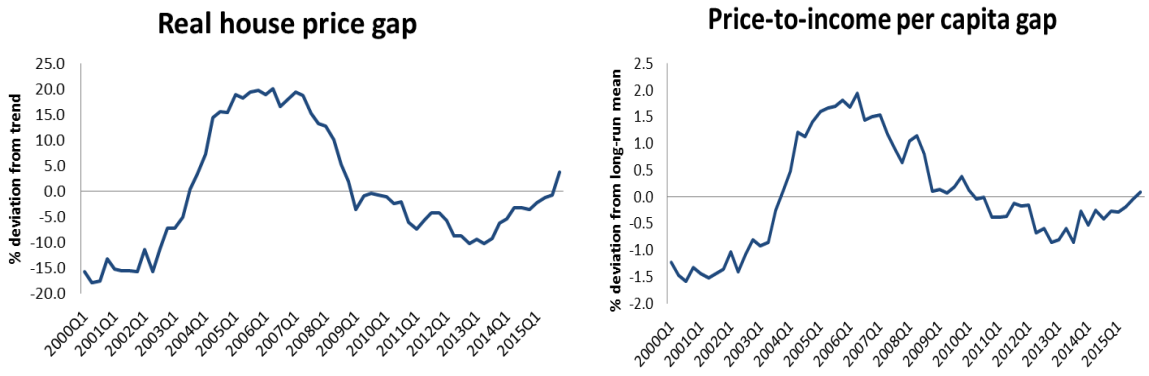

Figure 3: Demand indicators (Households' perspective)

Source: Central Bank of Malta, author's calculations

[7] See Grech (2014) for further details on disposable income in Malta.

The next two indicators capture the supply side:

Housing investment-to-GDP ratio: the ratio of housing investment to GDP represents the supply side. A housing sector that accounts for a high percentage of GDP implies a state of overheating, which can be interpreted as a sign of a housing bubble. Conversely, rising house prices stimulate construction, which would dampen excessive price increases in the medium term. The gap is obtained by subtracting the housing investment-to-GDP ratio from its long-run mean (2000-2015).

Price-to-construction cost: construction costs are another important supply-side factor. Applying Tobin's *q* (the ratio of market value of a firm to its replacement cost) to properties, this cost measure is calculated as the house price divided by the construction cost. The latter includes both labour and materials costs in construction. An important limitation of this concept is that that it fails to consider land prices. The index is linearly de-trended to derive the price-to-construction cost gap.

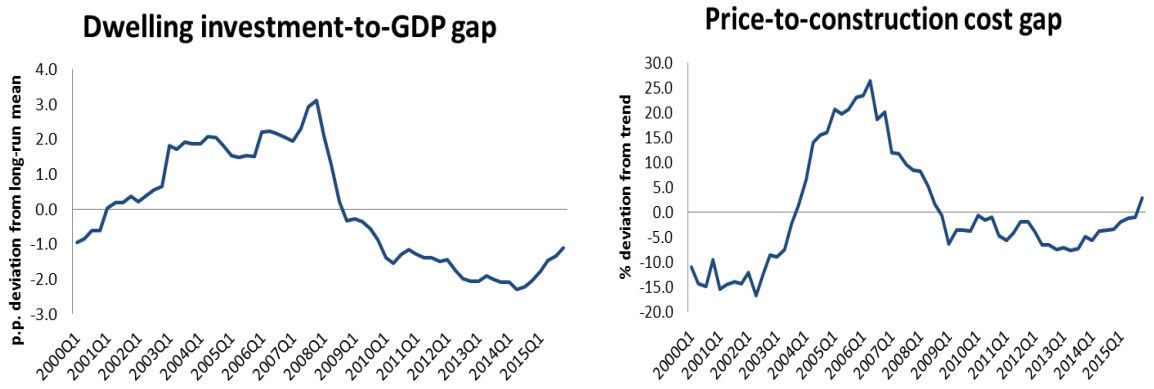

Figure 4: Supply indicators (Firms' perspective)

Source: Eurostat, Central Bank of Malta, author's calculations

Finally, the last indicator captures the banking system perspective:

Loan-to-income ratio: this index considers bank loans to households for mortgages relative to household income. As before, the latter is proxied by the CBM disposable income indicator. When this ratio gets too high, households may become increasingly dependent on rising house prices to service their debt. The 'gap' is derived by linearly de-trending the four quarter moving-average of this index.

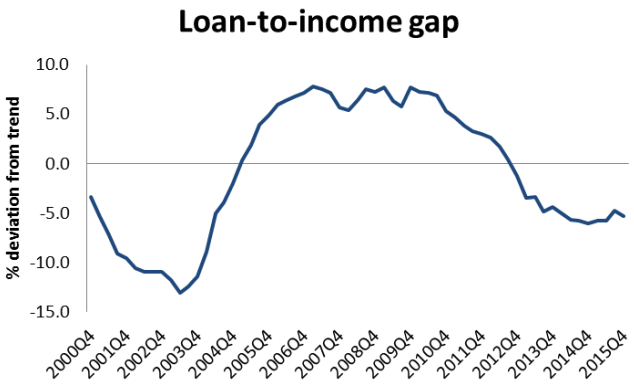

Figure 5: Banking system indicator

Source: Central Bank of Malta, author's calculations

Aggregation

The five indicators enter the aggregate misalignment indicator in 'gap' form and normalized (i.e. divided by their standard deviation). The overall indicator is based as a weighted sum of the individual sub-indices:

$$MI_t = \sum_i v_i x_i$$

where *MI* stands for the overall misalignment indicator and *v* refers to the weight given to the individual sub-indices *x*. The weight for each component is derived by applying a principal component analysis (PCA) on the basis of the cyclical co-movement of the separate indicators. The weights are derived using the factor 'loadings' from the first principal component, which explains 74% of the variance between these indicators. The sub-indicator weights are shown in Table 1.

Table 1
Sub-indicator Weights

	%
Demand	
Price-to-CPI gap	23.3
Price-to-income gap	23.3
Supply	
Price-to-construction cost gap	22.8
Construction investment-to-GDP gap	16.4
Banking sector	
Loan-to-income gap	14.2

Source: Author's calculations

Results

Figure 6 plots the misalignment indicator and the contributions made by each sub-component. The index shows a period of overvaluation in house prices starting from around the time of EU membership in 2004 that peaked in 2006-2007. During this period, the misalignment indicator clearly shows significant overvaluation of house prices in Malta. The disequilibrium started to be corrected from around 2008 following the slowdown in house prices. All the sub-indices contributed to the correction, although the banking system-wide indicator (loan-to-income gap) lagged behind the other indices. The misalignment index reached a trough in 2013, with all the sub-components contributing negatively. Starting in 2014, however, the index started to recover such that, by end-2015, the overall indicator was broadly in equilibrium.

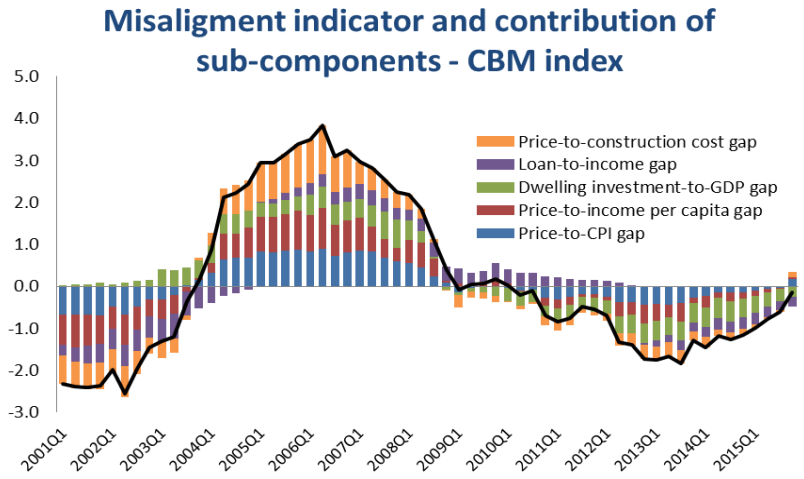

Figure 6: Misalignment indicator based on CBM house price index

Source: Author's calculations

To cross-check the results, Figure 7 plots the misalignment indicator using the NSO house price index, which is based on contracted house prices. A limitation of this index is that it starts in 2005 and hence, the gap analysis is conducted on only 10 years of data. This is clearly a major drawback since the series does not cover an entire house price cycle, which tends to be longer than the traditional business cycle. Hence, the results should be treated with caution. In addition, there are also timing differences between the two indices, with the NSO index lagging behind the CBM index by around one year. Appendix A1 describes the main differences between the two house price indices.

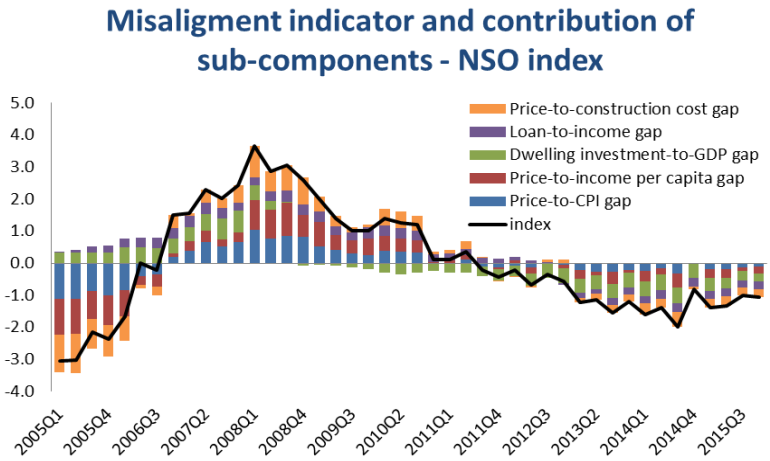

Figure 7: Misalignment indicator based on NSO house price index

Source: Author's calculations

The analysis based on the NSO index suggests that the undervaluation gap remains more pronounced at the end of 2015 compared to the CBM index. Due to the timing differences, the NSO index shows that the overvaluation peak was reached in 2008 with a trough in 2014. In addition, the indicator exhibits a less pronounced recovery in 2015, owing to more subdued growth in the NSO house price index compared to the CBM index over the past two years (see Figure 8).

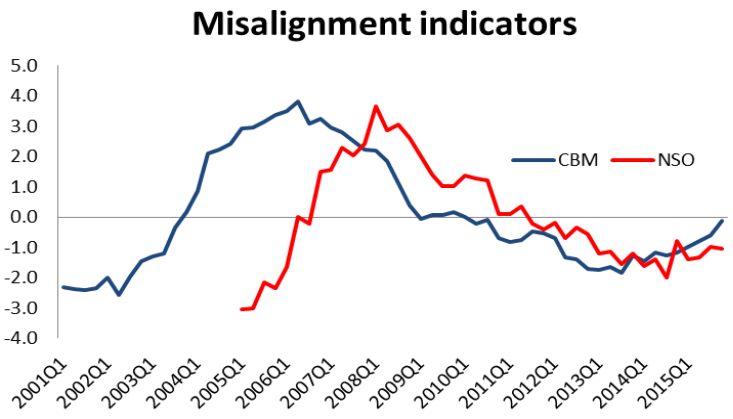

Figure 8: Comparison of misalignment indices

Source: Author's calculations

5. Sensitivity analysis

Given their unobservable nature, estimates of house price cycles are characterised by a considerable degree of uncertainty. The misalignment index is therefore cross-checked with statistical filtering techniques to assess the plausibility of the results. In addition to estimation or de-trending issues, the analysis on Maltese data is somewhat more challenging compared to other advanced economies due to the relatively short quarterly time series, especially since house price cycles are typically found to

be longer than the business cycles. For instance, Runstler and Vlekke (2016) document house price cycles with a length of between 12 and 18 years. Similarly, Goodhart and Hofmann (2008) and European Commission (2012) use a smoothing parameter of 100,000 for the univariate HP filter, applied on quarterly data that typically starts from the early 1970s, to derive the house price cycle.

To address the limitation imposed by the relatively short quarterly time series in Malta, the robustness analysis is conducted using a longer time series, with real house prices extended backwards using the annual historical database documented in Grech (2015). The series for house prices in the latter database starts from 1980 and a quarterly frequency was obtained using the cubic-spline transformation. A quarterly series for the RPI is available from the Central Bank of Malta's website starting from the mid-1970s. The sensitivity analysis is only conducted on the CBM house price index since this coincides with the definition used in Grech (2015).

The first statistical approach to decompose the house price cycle is the HP filter. The latter is commonly used and easy to interpret but suffers from several well-known drawbacks. In particular, it poses problems at the end of the sample and the choice of the smoothing parameter (λ) substantially influences the outcomes. To minimise the end-point problem, the time series is usually extended using ARIMA models while different smoothing parameters can be applied to illustrate the sensitivity of the resulting cycle to the choice of λ. Both approaches are used in the subsequent analysis. The real house price index is extended for the period 2016-2020 using an ARIMA(1,1,1) model. Two different smoothing parameters are used. The first measure uses a smoothing parameter of 100,000 following Goodhart and Hofmann (2008) and European Commission (2012). The second measure applies a λ of 400,000 following the recommendation of the European Systemic Risk Board (ESRB) for the calculation of the counter-cyclical capital buffer on the basis of the credit-to-GDP ratio.

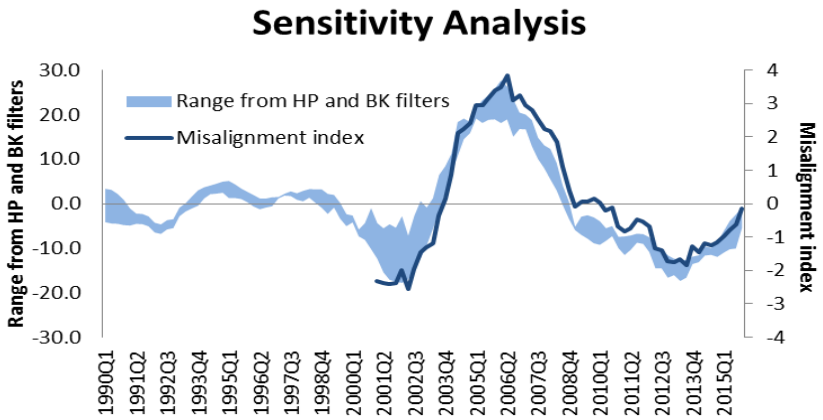

Figure 9: Comparison of misalignment index with range from statistical filters

Source: Author's calculations

In addition to the HP filter, another measure of the real house price gap is derived using the Baxter-King band-pass filter. In line with the literature, the band-pass filter is applied with a frequency band of

32 to 120 quarters, which differs from the frequency band of 8 to 32 quarters that is usually employed to extract business cycles with band-pass filters (Runstler and Vlekke, 2016).

Figure 9 plots the misalignment index together with the range of real house price obtained from the three different statistical filters. Both measures provide a similar interpretation of the property price cycle in Malta, including the peaks and troughs. Like the misalignment index, the statistical filters also point to an overvaluation of house prices in mid-2000s that peaked in 2006, which was followed by a slowdown with prices reaching a trough in 2013. All three statistical filters point to a gradual recovery in the cyclical component of house prices since 2013.

6. Conclusion and way forward

This paper presented a multiple indicator approach to identify house price valuation in Malta based on fundamentals. Based on the CBM index, the misalignment indicator shows a period of overvaluation in house prices that peaked in 2006-2007. This disequilibrium started to be corrected following the decline in house prices, reaching a trough in 2013. Starting in 2014, however, the index started to recover such that, by end-2015, house prices were broadly in equilibrium. The recovery was driven by a number of factors, such as targeted government policies, buoyant economic growth that boosted disposable income and possible portfolio rebalancing by investors towards the property market in the context of the prevailing low interest rate environment. Social and demographic factors are also having an important impact on the housing market. With prudent bank lending policies, risks to financial stability from house price increases appear to be limited at the current juncture, especially since the ongoing recovery in house prices is not driven by rapid credit growth. Even though the misalignment index suggests that house prices are broadly in equilibrium, the momentum of house price increases could imply that they can go above such equilibrium if the trend persists. This poses a dilemma for monetary policy makers as macro-prudential policy instruments are mostly effective to address credit-fuelled speculation but are much less effective if boom conditions are not driven by credit.[8]

More generally, the indicator presented in this paper is intended to provide a broad guide to the current momentum in house prices. The actual numerical results should not be overstated given the limitations in the construction of this index. Among the latter, the level of the variables (e.g. international comparison of property price levels), as well as other important determinants, such as foreign capital inflows, are not factored in the analysis due to lack of data. Perhaps more importantly, data on rents are also not available and hence, the price-to-rent ratio, which compares the costs of owning a property to renting it, could not be computed.[9] Rental costs are likely to play an increasingly important role in light of the influx of foreign workers, which increased demand for housing, especially

[8] The current scenario of very accommodative monetary policy and low/negative interest rates risk forcing investors into portfolio shifts that finance property development without resorting to traditional bank finance channels.

[9] Data on rents is only available on an annual basis starting from 2006. The HICP rents index is not appropriate either since more than 80% of this index consists of subsidised rents.

in certain areas. Going forward, statistics on rents, once they become available, should definitely form part of the fundamental sub-indicators of the misalignment index.

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Appendix A: Differences between CBM and NSO house price indices

This Appendix reviews the characteristics of the two property price indices available in Malta. The CBM property price index is based on advertised prices in a leading newspaper while the NSO index is based on contracted prices registered with the Inland Revenue Department (IRD). Both indices draw on the median price at each point in time and across different property types. These median prices are then aggregated to an overall median price index. Given the differences in data sources, the indices display different trends during specific periods as well as year-on-year growth rates (see figure A1).

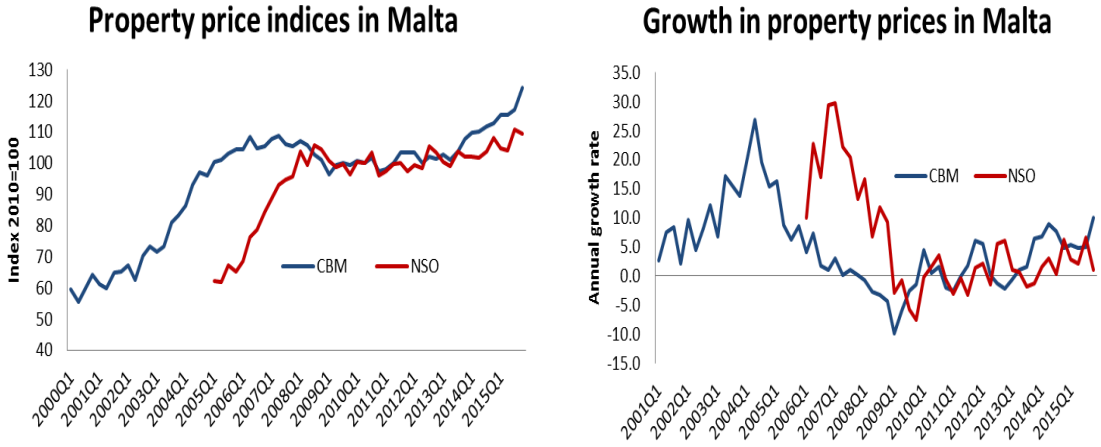

Figure A1: Differences between CBM and NSO house price indices

Source: Central Bank of Malta, National Statistics Office, author's calculations

The CBM index is published every quarter and is not revised backwards, given that it is based on adverts placed at a specific point in time On the contrary, the NSO index is subject to revisions. The last 4 quarters at the time of the news release, which is published once a year, are deemed provisional and data before this period is also frequently updated with incoming data. Both indices are chain-linked.

Another difference relates to the residential units included in the indices. The NSO index only covers apartments, maisonettes and terraced houses. In addition to these, the CBM index also includes town houses, houses of character and villas, with the weight of these three being around 15%.