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Research Article

House purchase affordability for first time buyers in Malta

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Abstract. Malta is a nation of homeowners but there is increasingly widespread preoccupation that housing is no longer affordable. With a homeownership rate of around 80% that has remained stable for more than a decade, any metric of affordability should focus on the distribution of outcomes across households rather than relying on economy-wide averages. In this regard, first-time buyers tend to be among the most affected group. Housing affordability for first-time buyers has mainly two components—the ability to access sufficient credit from a bank (purchase affordability) and, subsequently, the ability to maintain mortgage repayments (repayment affordability). This paper develops an affordability index that is specifically targeted for first-time buyers for the period 2000–2022. The focus on purchase affordability recognizes that bank lending policies and conditions play an important role for first-time buyers. In this paper, property prices refer to a two-bedroom finished apartment in selected localities across Malta using realistic assumptions about bank lending policies. The paper shows that affordability differs significantly by locality. This heterogeneity by locality could explain the subjective perceptions about the deteriorating housing affordability in Malta as first-time buyers with low-to-medium levels of income are likely to face difficult trade-offs in this regard.

Keywords: Housing affordability, house prices, first-time buyers, Malta.

1 Introduction

Despite being a nation of homeowners, there is increasingly widespread preoccupation that housing in Malta is not affordable. This concern conflicts with statistics showing that the homeownership rate in Malta has remained relatively stable at around 80% over the last decade and that Maltese households have among the lowest housing overburdened rates, defined as those spending more than 40% of their disposable income on housing, among the EU countries (Frayne et al., 2022). Any metric of affordability should thus depart from economy-wide averages and instead focus on the distribution of outcomes across households, with the young and those on low-income being among the most affected. First-time buyers—those that have yet to climb on the property ladder—especially those with low-to-medium levels of income, clearly fall within this category.

This paper is concerned with housing affordability for first-time buyers. For this category, housing affordability has two components. The first is defined as 'purchasing affordability' and refers to the ability to borrow sufficiently from a bank to purchase a property. This notion of affordability recognizes the presence of credit constraints in mortgage markets that can arise, for instance, due to insufficient income or inadequate savings for the deposit (Micallef, 2022b). Of crucial importance is the deposit for the down-payment, which serves two purposes (Meen, 2018). First, the deposit is required by banks to account for adverse selection under asymmetric information and, second, for financial stability purposes to satisfy the regulations by financial regulators. The second component of affordability refers to 'repayment affordability' and it involves the ability of the borrower to maintain the repayments over the duration of the mortgage.

This paper extends the analysis in Micallef (2022b) by developing a housing affordability index that is specifically targeted for first-time buyers. The index refers to the ratio of household income to the minimum income required to qualify for a mortgage to purchase a property. The latter is a function of five key parameters: property prices, bank lending rates for mortgages, years to loan repayment, loan-to-value (LTV) ratio and the debt-service-to-income (DSTI) ratio. Hence, the index focuses

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specifically on purchase affordability, recognizing that for many first-time buyers, the challenge of getting a mortgage, especially the accumulation of sufficient funds for the deposit (and other housing-related expenses), tend to be much more onerous than repaying the loan over several years. In doing so, it recognizes that whilst economists, analysts and policy makers commonly refer to the 'housing market', in practice this market consists of several sub-markets—of which the entry level market targeted by first-time buyers is just one—that are best analyzed separately. Another contribution of the paper refers to the analysis of purchase affordability over the business cycle since the index is calculated over a long period, covering the period between 2000 and 2022.

The rest of the article is structured as follows. Section 2 provides a brief review of the literature. Section 3 describes the methodology and the data used in this study. Section 4 discusses the results while Section 5 provides a sensitivity analysis to test how the baseline results change to alternative assumptions about the main parameters used in the model. Section 6 discusses the results and concludes.

2 Literature review

Housing affordability expresses the relationship between households' income and its housing costs. A common metric to assess affordability is the house price-to-income ratio (Meen, 2018). The main advantage of this approach is that it relies on data that are readily available for most countries, which facilitates international comparisons. In turn, this indicator forms the conceptual basis for the ratio method of affordability, which is typically defined as housing expenditure-to-income ratio (Edmiston, 2016). The intuition behind this approach is that expenditure on housing should not exceed some threshold of household income. The threshold for being cost-burdened is commonly defined as 25% or 30% of household income (Brooks, 2022; Edmiston, 2016).

Most applications of the ratio method of affordability focus entirely on the aggregate position of the economy and are thus inadequate to capture the position of specific groups such as first-time buyers. Indeed, this method fails to make a distinction between purchase affordability (i.e., the ability of borrowers to obtain the necessary funds to purchase a property given bank regulations and conditions) and repayment affordability (i.e., the overall burden of repaying the mortgage over its lifetime). Gan and Hill (2009) make this distinction by drawing on the Value-at-Risk concept that takes into consideration the entire distribution of house prices and income rather than just the median. These authors show that due to the skewness in the house price and income distributions, the housing affordability problem may be significantly worse for lower income households than suggested by standard median measures. Another limitation is that it fails to account for other macroeconomic trends, such as the long-term decline in nominal interest rates or developments in the financial sector. For instance, lower interest rates allow households to purchase more expensive dwellings for a given level of income, thus over-stating the affordability problems during a low interest rate environment (Meen, 2018).

A common application of the ratio approach is the Housing Affordability Index (HAI) proposed by the National Association of Realtors (NAR) in the United States (NAR, 2022). The HAI computes the ratio of the median family income to the income required to qualify for a mortgage assuming a 20% down payment (NAR, 2022). While this approach is well-suited to assess purchase affordability, most applications for Malta focus on the median household instead of first-time buyers (D. Camilleri, 2011; Darmanin, 2008; KPMG, 2022).

The literature on first-time buyers in Malta is relatively scarce, mostly due to the lack of data on this category. Recently, however, the Housing Authority made available statistics on the profile of first-time buyers in Malta, which was collected from the government scheme that gave €1,000 every year for 10 years to first-time buyers (Times of Malta, 2023). According to the data, most first-time buyers purchased a property in St. Paul's Bay, Zurrieq and Birkirkara, with Mosta, Zabbar, Zebbug, Qormi, Zejtun, Marsascala and Mellieha also being popular localities. With few exceptions, these localities tend to be different from the most popular localities for rental accommodation (Malta Housing Authority, 2022).

The average age of first-time buyers stands around 30 years, with most of them purchasing an apartment. While the range of property values is quite wide, most first-time buyers spend between €150,000 and €300,000 on their property, with the range depending, among several factors, on whether they are single borrowers or a couple. Indeed, around half of first-time buyers in 2022 purchased a property on their own, which is somewhat contradictory from studies that focus on the affordability of young borrowers in Malta (Briguglio & Spiteri, 2022). One reason for this discrepancy can be due to the assumptions made about borrowers' income since data from the Labour Force Survey focuses on the basic salary, which excludes overtime payments, bonuses, as well as income earned from part-time employment. Using the property database of a commercial bank in Malta, Bray and Ellul (2023) suggest that, at the micro level, property affordability reflects individual choices based on several factors, including the property type, size, neighborhood, and loc-

HAI = 100	Income for FTB is exactly sufficient to purchase a property
HAI > 100	Income for FTBs is greater than the minimum income required to purchase a property
HAI < 100	Income for FTBs is insufficient to purchase a property

Table 1: Thresholds for the Housing Affordability Index.

Variable	Source	Time-variation	Value for 2021
Average income	National Statistics Office, own calculations	Yes	€ 20,390
Couple factor	Own assumption	No	1.9
Property prices	Calculations based on CBM advertised property dataset	Yes	€ 217,375
Loan-to-Value ratio	Own assumption	No	90%
Interest rate	Central Bank of Malta	Yes	2.87%
Years to repayment	Own assumption	No	35
Debt service-to-income ratio	Own assumption	No	25%

Table 2: Data sources and assumptions.

ality, which can be masked at the macro level.

3 Methodology and data

The HAI is calculated according to the following formula:

$$\text{HAI} = \frac{\text{Household income for first–time buyers}}{\text{Qualifying income}} \quad (1)$$

In general, identifying persistent shifts in the Beveridge curves requires a longer time series. However, from the available data, we can still see possible break in the relationship that corroborate these arguments. As expected, this shows that there has been both a leftward movement and an inward shift over the years, suggesting an improvement in matching efficiency coupled with a decrease in NAIRU. A notable break can be seen during the pandemic as the job vacancy rate fell sharply and the unemployment rate rose only slightly, causing the Maltese Beveridge curve to shift inward. The inward shift was driven by a low job separation rate due to unprecedented fiscal interventions and uncertainty, leading to a decline in the job vacancy rate. 2021 was followed by a recovery in the vacancy rate and a slight decline in the unemployment rate. The year 2022 was also marked by a decrease in vacancy along with a decrease in overall unemployment.

The household income in the numerator is calculated as the income for a typical first-time buyer multiplied by the average number of persons taking out the mortgage. The qualifying income in the denominator refers to the minimum income required for a household to qualify for a mortgage to purchase a property (Micallef, 2022b). This is a function of 5 key parameters: house prices, bank lending rates for mortgages, years to loan repayment, loan-to-value (LTV) ratio and the debt-service-to-income (DSTI) ratio. The HAI ratio is multiplied by 100 to yield an index number. Table 1 stipulates the thresholds for the HAI (NAR, 2022). For instance, a HAI index exceeding 100 implies that the income of first-time buyers (numerator) exceeds the qualifying income required for a mortgage (denominator).

The HAI is calculated over the period between 2000 and 2022. The data sources and assumptions for the main parameters in the model, which are summarized in Table 2, are described in more detail below:

Household income: Income is sourced from National Accounts statistics, which is preferred from other sources due to its long time series. In the absence of granular statistics on income, the average salary is defined as the ratio of wages and salaries to the number of employees. Statistics from the National Accounts are preferred to the Labour Force Survey because, as discussed above, income statistics from the latter only refer to the basic salary. Some adjustments are made for first-time buyers that rely on elasticities calculated by Debono (2021). According to

Cluster	Key localities in the cluster	Average property price in 2021	Population in 2021	Share of total population
B	Gzira, Msida, Ta Xbiex	€ 237,923	26,010	5%
E	St Paul's Bay, Mellieha	€ 222,576	44,780	9%
F	Birkirkara, Floriana, Hamrun, Pieta, Qormi, San Gwann, Santa Venera, Luqa	€ 201,311	92,624	18%
G	Cospicua, Vittoriosa, Senglea, Kalkara, Fgura, Paola, Tarxien, Zabbar, Zejtun, Ghaxaq, Gudja, Marsascala, Birzebbugia	€ 195,311	125,430	24%
H	Zurrieq, Dingli, Qrendi, Rabat, Mgarr, Siggiewi, Zebbug	€ 229,401	70,639%	14%

Table 3: Clusters included in the calculation of property prices.

this study, the income for a typical non-tertiary educated individual (AGE 25-34, ISCED 4-5 education) stood 23% lower than those aged 35-44 with a tertiary level of education (ISCED 6) and 4% lower of those aged 45-54 with a similar level of education (ISCED 4-5). Taking the most conservative estimate and rounding upwards, an individual first-time buyer is assumed to earn 25% lower than the average salary, which amounted to €20,390 in 2021.[2] The couple factor is assumed to be 1.9. This reflects the high activity rates of females aged 25-49 years and a gender wage gap of 10% in 2020 (Eurostat, 2022b).

Property prices: House prices reflect the interplay of demand and supply in the housing market. Estimates of property prices are determined by applying a hedonic approach using the advertised house price database maintained at the Central Bank of Malta (Brincat & Ghigo, 2022). The hedonic model estimated over the period 2019Q1-2022Q3 and controls for the property type, the size of the dwelling, the location—defined in terms of 10 clusters as in Micallef and Gauci (2022)—and other characteristics such as the availability of a garage, garden or pool facilities, proximity to a seafront or the presence of views. The methodology is based on Micallef et al. (2022) and Micallef (2022b) using a total of 70,466 observations. Estimates of house prices in euro are obtained

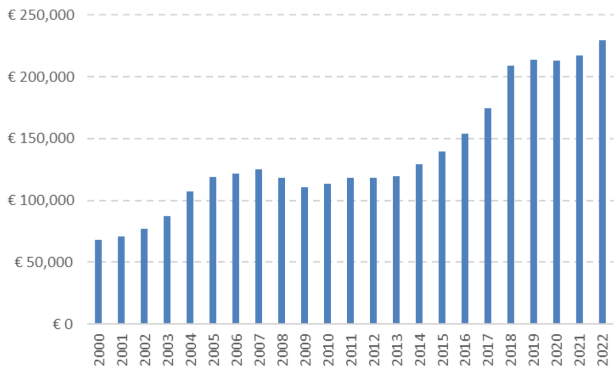

Figure 1: Property prices for a two-bedroom finished flat in Euro.

using the rolling time dummy method with Q=2 years.

For the purpose of this study, a typical property purchased by first-time buyers is assumed to consist of a two-bedroom finished apartment with no additional characteristics. The focus on apartment is in line with the type of properties sought by first-time buyers in Malta (Times of Malta, 2023). In terms of localities, the average of five clusters—B, E, F, G and H—is assumed (see Table 3 for details). These clusters include localities that are situated in the North, Central, Western and Southern part of the Maltese Islands and together account for almost 70% of the Maltese population in 2021. Excluded from calculations are some clusters, including the localities in the business, retail, and tourism hubs of Sliema, St Julian's and Valletta. The exclusion of these localities tallies with the information on the locality-choices of first-time buyers in Malta (Times of Malta, 2023). Given

[2] This approach yields close estimates to other available income statistics for comparable categories. The average basic salary in the Labour Force Survey stood at €19,590 in 2021 (this figure excludes allowances, bonuses, and overtime payments). The gross salary for a single individual earning 80% of the average salary from the Net Earnings Survey stood at €19,160 in 2021. The median disposable income for a household in the 16-34 age bracket from the Household Finance and Consumption Survey (HFCS) stood at €38,200 in 2020 (mean: €39,800)

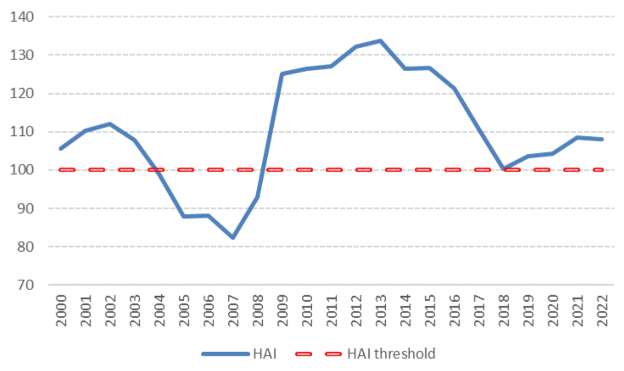

Figure 2: Housing Affordability Index for first-time buyers.

the relatively cheaper prices, the sister island of Gozo is also excluded to avoid biasing the property price estimates downwards. According to this approach, the average property price stood at €217,000 in 2021 and €230,000 in 2022 (rounded to the nearest €1,000). Estimates for 2022 are well within the range of properties purchased by first-time buyers in Malta (Times of Malta, 2023). Property prices prior to 2019 were calculated using the Central Bank of Malta advertised index for apartments.

Figure 1 plots the evolution of house prices as defined above over the period 2000-2022. It is important to note that the estimates derived from this approach stand on average 18% higher than the corresponding property price transactions published by the NSO for the period 2019-2022Q3. For instance, the average property transacted in the first three quarters of 2022 stood at €206,400. While transacted data is preferable to advertised listings, the publicly available information from NSO is only available at a highly aggregate level and does not even allow for a distinction between property types and sizes. Furthermore, it includes all residential transactions, including for airspaces, boathouses, or garages, which might explain the relatively lower value compared to the advertised prices. As a result of these limitations, advertised listings were deemed to be superior to the aggregate transacted information.

LTV ratio: This ratio stipulates the value of the loan given by the bank relative to the value of the property and is influenced both by bank lending practices and macro-prudential regulations. Within the context of the borrower-based measures introduced in Malta, LTV ratios for first-time buyers stand at 90% (Central Bank of Malta, 2019). The LTV ratio is thus assumed to be 90%, which implies a down-payment of 10%. This ratio is assumed to be time-invariant.

Retail interest rates: Interest rates refer to bank lending rates on mortgages and sourced from the Central Bank of Malta website. These rates depend on macroeconomic forces, such as the monetary policy stance and on bank-specific characteristics, such as solvency, liquidity, and credit risk (Micallef et al., 2016). Bank lending rates follow a downward trend during this period, declining from 6.5% in 2000 to 2.8% in 2022.

Years to repayment: The years to repayment depend on the age of the borrower. Mortgage repayments are typically capped until the retirement age, which in Malta stands at 65 years. The years to repayment are assumed to be 35 years. This implies that a prospective borrower is 30 years old and thus has 35 years to repay the mortgage. This assumption is in line with the average age of first time buyers in Malta (Times of Malta, 2023) and also consistent with survey statistics on the average age that young people in Malta leave their parental household (Eurostat, 2022a). This is assumed to remain unchanged during the entire period.

Debt service-to-income ratio: This is the ratio of the monthly debt payments to the borrower's gross monthly income. The DSTI ratio is influenced by internal bank risk management and lending practices. Typical values applied by retail banks in Malta stand between 25% and 30% (Central Bank of Malta, 2019). This means that the monthly repayment should not exceed 25% or 30% of the borrower's gross monthly income. For this exercise, a rather conservative DSTI ratio of 25% is assumed. This ratio is time-invariant.

4 Results

4.1 Aggregated results

Figure 2 plots the HAI for the period between 2000 and 2022.[3] The index follows a cyclical pattern around the threshold but does not exhibit a clear trend. Four episodes could be identified during this period. Housing was affordable in the early 2000s with an average HAI of 109 between 2000 and 2003. During this period, property prices were still relatively low compared to incomes, despite the high interest rate environment prevailing in the early 2000s. Figure 3 shows that property prices stood slightly less than four times the average annual salary for a first-time buyer couple. For single individuals, property prices averaged 7.2 times their salaries during this period.

A deterioration in housing affordability was recorded during the period 2004-2008. The HAI index averaged 90 during this period. Similar increases were also recorded in

[3] Figures for 2022 are still preliminary. Property prices for 2022 refer to the first three quarters of the year. Since only 2022Q3 data from the National Accounts were available at the time of writing, compensation per employee is projected to increase by 4.1% in 2022 in line with CBM projections in 2022Q4.

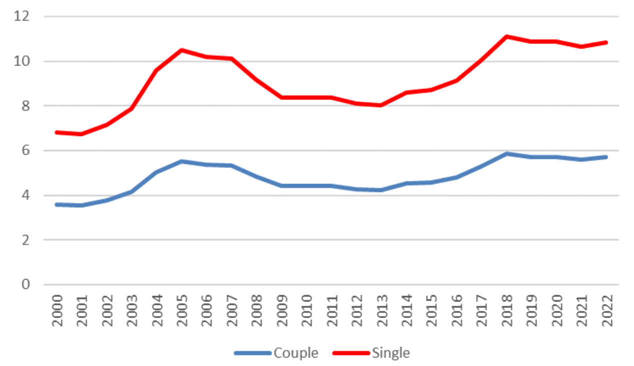

Figure 3: House price-to-income ratio.

the property price to income levels. The price of property as a result stood at about 5.2 times the average annual salary of a couple and to almost 10 times for a single individual. This deterioration occurred as the increase in property prices far outstripped the gains in wages, despite the slightly lower interest rates on mortgages. This finding is consistent with other studies of house price misalignment in Malta during this period (Gatt & Grech, 2016; Micallef, 2018).

Affordability improved significantly in the aftermath of the Great Recession. Between 2009 and 2016, the HAI averaged 127. This improvement was driven by two factors. First, house prices have not increased during the first part of this period and, by 2013, they were still slightly lower than the pre-recession peak of 2007. Overall, property prices and salaries moved broadly in line during most of this period although house prices started to register double digit growth from 2016. The second important factor behind the improvement in affordability was the sharp decline in interest rates following the monetary easing by the European Central Bank in the aftermath of the Great Recession and the European Sovereign Debt crisis. Bank interest rates to households for mortgages have declined by around 2 percentage points between 2008 and 2016, from 5.1% to 3.2%. As a result of these factors, property prices stood around 4.5 times the annual salary for a first-time couple. The corresponding ratio for a single buyer stood at 8.5.

The final period refers to post-2017 with a decline in housing affordability although the HAI index remained above 100. The HAI average 106 between 2017 and 2022, having declined to 100 in 2018 before recovering to 108 in 2021 and 2022. The deceleration in the index was mostly driven by sharp increase in house prices, which rose by double digit rates between 2016 and 2018, despite the continued downward trend in bank lending rates for mortgages. During the COVID-19 period, house prices increased at a slower pace compared to incomes, which explains the slight pick-up in the HAI index after 2020. Overall, the drop in the HAI index during the 2017-2022 period compared to 2009-2016 is reflected in rising house price to income ratios. Since 2017, the average property price for a first-time buyer couple and single individual stood around 5.7 and 10.7 times their annual salaries, respectively.

These calculations only focus on the income required to qualify for a mortgage but do not take into consideration the additional costs associated with this process. One of the largest upfront expenses that require cash in hand is the initial deposit, which tends to be around 10% of the value of the property for first-time buyers in Malta. Given the average property price of around €230,000 in 2022, a prospective borrower should have accumulated savings of €23,000—10% of the value of the property—for the down-payment. Savings for the down-payment can be a considerable barrier to homeownership for low-to-median income first-time buyers, especially those that cannot rely on others', such as their parents , financial assets for assistance. In addition to the downpayment, there are also other fees associated with the purchase of a property, such as notary and architect fees, home/life insurance policies and stamp duty.

Finally, additional funds are needed to furnish the property and make it habitable. In the absence of savings, these funds for furnishings will have to be borrowed from the bank. The interest rate on furnishings tends to be higher than the mortgage rate—in 2022, the average interest rate charged by local banks on consumer credit stood at 4.6%, around 1.8 percentage points higher than the mortgage interest rate.

4.2 Aggregated results

In addition to the aggregate HAI index, the results can be computed at a regional level according to the clustering of localities adopted in this study. Estimates of the benchmark property type—two bedroom finished apartment with no additional amenities—differ substantially across the clusters. In 2021, the estimates from the hedonic model range from €378,344 in cluster A that comprises the localities of Sliema, St. Julian's and Valletta to €154,796 in Gozo.

Table 4 illustrates the heterogeneity in housing affordability by cluster for a two-bedroom finished apartment in 2021. For comparison purposes, the last row of Table 4 reproduces the results for the aggregate HAI in 2021. Except for property prices, the other assumptions in the model remain unchanged. The locational disparity in affordability is in line with Bray and Ellul (2023). The results indicate that the HAI stood below 100 in four clusters

Cluster	Key localities in the cluster	Property price	HAI
A	Sliema, St Julian's, Valletta	€ 378,344	62.3
B	Gzira, Msida, Ta Xbiex	€ 237,926	99.1
C	Ibragg, Madliena, Pembroke, Swatar, Swieqi	€ 326,152	72.3
D	Attard, Balzan, Ghargur, Iklin, Lija, Mosta, Naxxar	€ 253,761	92.9
E	St Paul's Bay, Mellieha	€ 222,576	105.9
F	Birkirkara, Floriana, Hamrun, Pieta, Qormi, San Gwann, Santa Venera, Luqa	€ 201,311	117.1
G	Cospicua, Vittoriosa, Senglea, Kalkara, Fgura, Paola, Tarxien, Zabbar, Zejtun, Ghaxaq, Gudja, Marsascala, Birzebbugia	€ 195,662	120.5
H	Zurrieq, Dingli, Qrendi, Rabat, Mgarr, Siggiewi, Zebbug	€ 229,401	102.7
I	Gozo	€ 154,796	152.3
HAI	**Aggregate HAI**	**€ 217,375**	**108.4**

Table 4: HAI for a two-bedroom finished apartment by cluster in 2021.

in 2021: cluster A (Sliema, St Julian's and Valletta), cluster B (Gzira, Msida and Ta Xbiex), cluster C (including, among others, Swieqi, Ibragg, Madliena and Pembroke) and cluster D (including, among others, Attard, Balzan, Lija, Mosta and Naxxar). Taken together, these four clusters account for around 28% of the Maltese population according to the estimates from the 2021 Census.

In Malta, housing remains mostly affordable in cluster G (including localities such as Fgura, Zabbar, Paola, Zejtun, Marsascala, Marsaxlokk and the 3 cities of Vittoriosa, Cospicua and Senglea), cluster F (including localities such as Birkirkara, Floriana, Hamrun, Pieta, Qormi and San Gwann) and cluster E (including St Paul's Bay and Mellieha). The HAI is close, though above, 100 in cluster H that includes, among others, localities like Rabat, Siggiewi, Mgarr and Zurrieq. This exercise involves some inevitable degree of aggregation and that, even within these localities, properties in some neighbourhoods may still be outside the budget of first-time buyers, especially for properties near the seafront or with views. Housing remains the most affordable in Gozo, with an HAI index of 152 in 2021.

The heterogeneity observed in property prices—and hence affordability—by cluster could explain the divergence between objective indicators and subjective evaluation of affordability (Sunega & Lux, 2016). Despite the aggregate affordability, prospective first-time buyers, especially those with low-to-medium levels of income, are likely to face difficult trade-offs, for example, in terms of location, property type and size. In the absence of financial assistance from their parents, some will find it difficult to purchase a property in the locality or neighbourhood in which they were born and raised. This could influence subjective perceptions of affordability, especially if borrowers evaluate such affordability in relative terms, that is, in relation to some reference group or historical experience (such as the properties of their parents or friends).

5 Sensitivity analysis

This section provides a sensitivity analysis to assess how the findings are affected by changes in key assumptions. The analysis focuses on estimates for 2021, which is the last year for which full year data for property prices and income is available. Table 5 describes the sensitivity scenarios, while Table 6 shows how the baseline HAI, which stood at 108.4 in 2021, changes in response to these different scenarios, each one affecting one key variable in the model whilst keeping the other parameters constant.

The sensitivity analysis for the three time-varying variables—income, property prices and interest rates—consist of adverse scenarios. Since the model is symmetric, favourable developments in these variables from the perspective of borrowing households (e.g., higher incomes or lower property prices) would have a positive impact on the HAI index. Scenarios for the other time-invariant parameters reflect realistic situations that could face first-time buyers. These consist of a lower LTV ratio (which translates into a higher down-payment requirement from

Parameter	Description
Income	Decline in income from €20,390 to €18,500
Couple	Decline in couple factor from 1.9 to 1.0
Property price	Increase in property prices from €217,375 to €235,000
Down-payment	Increase in down-payment from 10% to 15%
Interest rate	Increase by 1 percentage point from 2.87% to 3.87%
Years to repay	Increase in years to repayment from 35 years to 40 years
Debt-service-to-income (DSTI)	Increase in DSTI ratio from 25% to 30%

Table 5: Description of sensitivity analysis

10% to 15%), an increase in the years to repayment from 35 to 40 years (implying prospective buyers of 25 years of age instead of 30 years as in the baseline model) and a higher debt-service-to-income ratio, from 25% to 30%, applied by the banks. A final scenario switches off the couple factor to proxy a situation with a single buyer instead of two wage-earners.

The results are illustrated in Table 6. Referring to column 2, an annual income of €18,500 for the main reference person in the household would leave insufficient income to qualify for a mortgage loan, as shown in final row with an HAI slightly below 100, as the total household-income is below the qualifying income. As expected, a single buyer with an annual salary of €20,390 (column 3) would not qualify for a mortgage as the resources fall way short of the qualify income of €35,731. This is in line with other recently published studies that point to the difficulty for single individuals on relatively low-to-medium levels of income to get on the property ladder (Briguglio & Spiteri, 2022; Grant Thornton, 2022). These borrowers would have to find a less expensive property than the one considered in the baseline scenario. Column 4 illustrates that the baseline household income leaves enough resources for a household to purchase a property of €235,000. A 1-percentage point increase in the interest rate, from 2.7% to 3.7% (column 6), would lower the HAI index to below the 100-mark threshold. Assuming that borrowers having sufficient savings for the downpayment, a decline in the LTV ratio (column 5) improves the HAI index as it lowers the size of the mortgage. As expected, longer years to repay the mortgage (column 7) and a more generous coverage ratio (column 8) result in improved housing affordability. In the last two scenarios, the HAI stands between 117 and 130.

6 Discussion and conclusion

This paper has calculated a housing affordability index for first-time buyers in Malta over the period 2000-2022. The relatively long period considered allows for an assessment of how housing affordability has evolved over the business cycle. Property prices refer to a two-bedroom finished apartment in selected localities across Malta using realistic assumptions about bank lending policies for prospective buyers, computed for both co-buyers and single individuals. This approach is deemed to be superior to the original HAI indicator (NAR, 2022) and subsequent applications for Malta (D. Camilleri, 2011; Darmanin, 2008; KPMG, 2022), which are computed for the median household, many of whom are already homeowners. The baseline assumptions are broadly in line with the profile of first-time buyers in Malta in terms of type and value of property purchased and the age of the borrowers (Times of Malta, 2023).

The main limitation of the framework used in this paper is that it is based on a partial equilibrium assessment. The sensitivity analysis relies on the 'ceteris paribus' assumptions—holding everything else constant—but some of the variables, especially the time-varying ones, are clearly endogenous. For instance, an increase in interest rates can also have an impact on household income and property prices (Borg et al., 2020). Hence, while the model is well-suited to explain historical developments, as done in this paper, one should be careful in using this framework to conduct 'what if' scenario analysis.

The historical analysis suggests that property price-to-income ratios have been trending upwards over the past two decades. For a two-wage earner couple, the ratio of property prices to the household income has increased from 3.7 in the early 2000s to 5.7 during 2018-2022. For single individuals, property prices have risen from around 7 times their income to almost 11 during the same period. For the latter, it is becoming increasingly difficult to purchase property unless they can rely on external assistance. A caveat in this regard is the assumption about income, which in the absence of granular statistics, refers to the average for the typical first-time buyer. It is unlikely that this measure adequately captures the extent to

		Assumed Changes						
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Baseline in 2021	**Lower Income**	**Couple to single**	**Property price**	**Down payment**	**Interest rate**	**Years to repay**	**Increase in DSTI**
Average income*	€20,390	**€18,500**	€20,390	€20,390	€20,390	€20,390	€20,390	€20,390
Couple factor	1.9	1.9	**1**	1.9	1.9	1.9	1.9	1.9
Household income*	€38,741	€35,150	€20,390	€38,741	€38,741	€38,741	€38,741	€38,741
Property price	€217,375	€217,375	€217,375	**€235,000**	€217,375	€217,375	€217,375	€217,375
Down payment	10%	10%	10%	10%	**15%**	10%	10%	10%
Interest rate	2.87%	2.87%	2.87%	2.87%	2.87%	**3.87%**	2.87%	2.87%
Years to repayment	35	35	35	35	35	35	**40**	35
DSTI ratio	25%	25%	25%	25%	25%	25%	25%	**30%**
Qualifying income	€35,731	€35,731	€35,731	€38,629	€33,746	€41,190	€33,147	€29,776
HAI	**108.4**	**98.4**	**57.1**	**100.3**	**114.8**	**94.1**	**116.9**	**130.1**

Table 6: Sensitivity to key assumptions. *Notes: *Average income refers the income for a single borrower. Household income refers to the total income for the household, which is calculated as the product of the average income and the couple factor.*

which some young borrowers strive to supplement their main source of income, for instance, through overtime or part-time employment. Indeed, recently available statistics show that around half of the first-time buyers in 2022 have purchased a property on their own (Times of Malta, 2023). These statistics indicate that the value of property purchased by single borrowers tends to be lower than in the case of two-wage earners, reflecting the trade-offs that ultimately must be made to suit one's budget.

Price-to-income ratios do not take into consideration financing costs, which until 2022, have been trending downwards over the past two decades. Hence, despite the rise in the price-to-income ratios, the HAI has remained above the threshold value of 100, for which the household income would be exactly equal to the income required to qualify for a mortgage. The only exception was the period between 2004 and 2008, when the HAI declined below 100, indicating that affordability was under strain. This finding is in line with other studies that show that property prices in Malta were misaligned from their fundamentals during this period (Gatt & Grech, 2016; Micallef, 2018).

The HAI index stood around 108 in 2021 and 2022. This result differs from recently published studies on housing affordability. For instance, KPMG (2022) points a more dire picture of affordability despite using a similar methodology, with the HAI index standing below 100 since 2017, even for apartments. It is difficult, however, to triangulate the result of such low purchase affordability, lasting more than 5 years, with other data sources, including surveys such as the EU-SILC that focus on income, housing and living conditions, among others. For instance, such a persistently low HAI index should have caused either a decline in the homeownership rate or an increase in the share of young adults still living with their parents. Recent trends in both these indicators do not support this conclusion. The homeownership rate has remained relatively stable at around 81% over the past decade (Zerafa, 2023). Similarly, statistics from the EU-SILC show that the share of young adults aged 25-29 years and 25-34 years living with their parents has remained broadly stable at around 64% and 46% respectively, and recent estimates are in line with their long-term (Eurostat, 2022a).

While the HAI index remained above 100 as at 2022, property prices differed significantly by locality. This is hardly surprising given the oft-repeated mantra of 'location, location, location' in real estate circles. The analysis by clusters indicates that property prices might not have been affordable for the typical first-time buyer household in four of the nine clusters considered in this study. The least affordable cluster includes the localities of Sliema, St Julian's and Valletta. Together, these four clusters account for slightly more than a quarter of the Maltese population in 2021. On the contrary, properties remained by far the most affordable in the sister island of Gozo. It is important to point out that even within the clusters included in the index, not all properties might be affordable to first-time buyers. For instance, some properties in these clusters might still be of out of reach for first-time buyers that are in certain neighbourhoods or with desirable amenities such as with views or close to the seafront. Location matters a lot when it comes to housing (Bray & Ellul, 2023).

This heterogeneity by locality could explain the subjective perceptions about the deteriorating housing affordability in Malta as first-time buyers with low-to-medium levels of income are likely to face difficult trade-offs. Such trade-offs could involve, for instance, decisions about location, property type and size. Some buyers might not be able to afford purchasing a property in the same locality of their parents. These trade-offs could exacerbate perceptions of an affordability crisis especially if borrowers evaluate affordability in relation to some reference group or historical experience, such as their parents or friends. Less commonly mentioned in this regard, though no less relevant, is the different conditions that existed in the past, in most instances involving significant and generous government intervention to encourage homeownership, compared to today's environment (A. Camilleri, 2000; Mifsud, 2000).

Another fundamental consideration is the importance of having sufficient funds saved for the down-payment. An implicit assumption of the HAI is that a prospective borrower has the required savings but accumulating these resources takes time and is no easy feat, especially in the absence of parental support. To give an example, a 10% deposit on a property of €217,375 amounts to €21,737—this represents more than a year's salary in the baseline case considered in this study and more than half of the minimum income required to qualify for a loan. This is not the only savings required and, as indicated above, the calculations abstract from other property-related expenses such as stamp duty, notary and architect fees, and insurance policies. The Maltese Government is aware of this constraint and, starting from 2020, the Housing Authority launched a scheme to assist prospective homeowners who despite being eligible for a mortgage do not have the necessary liquidity to pay the down-payment on the signing of the promise of sale.

One of the key variables in the framework presented in this paper is the interest rates on the mortgage. Interest rates have been on a declining trend over most of the period considered in this study, especially in the aftermath of the Great Recession of 2009. Since 2022, however, a combination of factors—such as supply chain disruptions due to the COVID-19 pandemic, high commodity prices, the war in Ukraine and tight labour markets—have led to significantly higher inflation rates. To combat these inflationary pressures, monetary authorities have started to tighten monetary policy by gradually raising interest rates. While in Malta policy rates tend to imperfectly and sluggishly passed to the bank retail rates (Borg & Cassar, 2023; Micallef et al., 2016), the estimates illustrated in the sensitivity analysis section implies that, ceteris paribus, higher interest rates will exert additional pressure on housing affordability.

Going forward, assessments of affordability should move away from simply considering median or averages and instead emphasize the distribution of housing and incomes (Gan & Hill, 2009). This paper is intended to be a step in this direction by moving away from the median household and instead tailor instead the analysis to first-time buyers. The information on first-time buyers from the Government Scheme is a rich data source that has only recently become available. More detailed studies, however, require additional granular data, some of which may not be available. For instance, detailed housing surveys that collect regular information on people's housing circumstances and the conditions of their housing, like the English Housing Survey, are not available in Malta. This information is crucial to ensure that housing policies in Malta are based on sound and accurate information and, equally importantly, designed to target those that truly require assistance.

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