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Charalampos Karagiannakis*, Panos Pashardes, Nicoletta Pashourtidou and Sofia Andreou

Executive Summary

The current economic crisis in Cyprus revealed the need for the development of tools for monitoring changes in the domestic property market. Developments in the real estate market and in particular the movements of property prices are highly relevant for both private sector decisions (e.g. investors, commercial banks) and policy-making (e.g. government, central banks). The systematic measurement of property prices via the construction of specialised indices can, inter alia, (i) lead to more informed decision-making by firms and households; (ii) provide commercial banks with valuable tools for identifying exposures of their loan portfolios and assessing the levels of their capital buffers and possible needs; (iii) assist policy-makers in the conduct of macro-prudential analysis and timely interventions as well as in the design of informed taxation schemes. In particular, this paper:

- presents details on the construction of a new database, using newspaper advertisements of monthly prices and related information about various types of property (houses, flats, plots etc.) in different districts of Cyprus over the post-2000 period;
- propose scientifically appropriate models for the estimation of property price indices that can provide a measure of the quarterly change in property prices, together with an assessment of the reliability of this measure;
- propose econometric models for the analysis of the factors (property characteristics and macroeconomic variables) which affect property prices;
- propose econometric models for the systematic estimation of projections for the future evolution of property prices.

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CONTENTS

ΠΕΡΙΛΗΨΗ

Η τρέχουσα οικονομική κρίση στην Κύπρο έκανε πιο επιτακτική την ανάγκη για την ανάπτυξη εργαλείων που αφορούν την παρακολούθηση των αλλαγών στην εγχώρια αγορά ακινήτων. Οι εξελίξεις στην αγορά ακινήτων και ειδικότερα οι αλλαγές στις τιμές των ακινήτων είναι σημαντικοί παράμετροι τόσο για τις αποφάσεις του ιδιωτικού τομέα (π.χ. επενδυτές, εμπορικές τράπεζες), όσο και για την χάραξη πολιτικής (π.χ. κυβέρνηση, κεντρική τράπεζα). Η συστηματική μέτρηση των τιμών των ακινήτων μέσω της κατασκευής εξειδικευμένων δεικτών μπορεί, μεταξύ άλλων (i) να οδηγήσει σε πιο τεκμηριωμένη λήψη αποφάσεων από τις επιχειρήσεις και τα νοικοκυριά (ii) να παρέχει πολύτιμα εργαλεία στις εμπορικές τράπεζες τόσο για τον έγκαιρο εντοπισμό σε ανοίγματα δανειακών χαρτοφυλακίων όσο και σε θέματα αξιολόγησης των κεφαλαιακών αποθεμάτων τους (iii) να βοηθήσει τους υπεύθυνους χάραξης πολιτικής σε θέματα μακροοικονομικής πολιτικής, καθώς και στο σχεδιασμό των συστημάτων φορολογίας του κράτους.

Πιο συγκεκριμένα, το άρθρο αυτό:

- παρουσιάζει τόσο λεπτομέρειες για την κατασκευή μιας νέας βάσης δεδομένων, χρησιμοποιώντας τις διαφημίσεις από τοπικές εφημερίδες για την συλλογή των μηνιαίων τιμών, όσο και σχετικές πληροφορίες για τους διάφορους τύπους των ακινήτων (κατοικίες, διαμερίσματα, οικόπεδα κ.λπ.) σε διάφορες περιοχές της Κύπρος την περίοδο μετά το 2000

- προτείνει επιστημονικά κατάλληλα μοντέλα για την εκτίμηση των δεικτών των ακινήτων που μπορεί να παρέχουν ένα μέτρο της τριμηνιαίας μεταβολής των τιμών, σε συνδυασμό με την αξιολόγηση της αξιοπιστίας του εν λόγω μέτρου

- προτείνει οικονομετρικά μοντέλα για την ανάλυση των παραγόντων (χαρακτηριστικά ακινήτων και μακροοικονομικές μεταβλητές) που επηρεάζουν τις τιμές των ακινήτων

- προτείνει οικονομετρικά μοντέλα για τη συστηματική εκτίμηση των προβλέψεων για τη μελλοντική εξέλιξη των τιμών των ακινήτων.

I. INTRODUCTION

A house is the largest single asset of most households. Furthermore, assets linked to residential real estate represent an important component of the aggregate portfolio of financial intermediaries. In recent years many countries across the globe (e.g. the USA, UK Japan, Spain) experienced booms and busts in property prices, often associated with movements in macroeconomic factors such as interest rates and economic growth. This cyclical nature of the residential real estate market has been a major topic of discussion over the years (Englund and Ioannides, 1997; Maclennan et al., 1998).

Economic theory suggests that wealth is one of the key drivers of aggregate consumption; therefore, a downturn in the property market is likely to be followed by a decrease in household consumption and, in turn, lower economic growth. Moreover, through the exposure of banks' lending portfolios to the real estate market, large declines in property prices could trigger tight credit conditions with negative effects on economic activity; and, subsequently, adverse financial conditions via increasing default rates and capitalisation needs. Thus, property prices influence the performance of the financial system, through their effect on the profitability and financial performance; and, therefore, they are of key interest to central banks charged with maintaining price and financial stability.

The property market can also impact on government revenue. It is a widely held view that the property tax is a stable revenue source over the business cycles. This is often cited as one of the primary virtues of property taxation. Booms and busts in the property market, however, can change government revenue through various channels, e.g. the property tax and the real estate transfer tax are positively correlated with the value (and the volume) of real estate transactions. Furthermore, the conditions in the property market can have other effects on government revenue, e.g. sales of materials used in construction directly affect VAT revenues; while personal income tax revenues can be affected by the reduction in employment related to construction and real estate activity (Byron et al. 2010).

A question of strong interest in the property and real estate literature is which micro- and macro-economic factors affect the level and change in property prices: the microeconomic approach mainly focuses on the relationship between the price and property characteristics, e.g. size, type, location etc (Carroll et al., 1996; Rodriguez and Sirmans, 1994; Fletcher, et al., 2000; Adair et al., 2000); while the macroeconomic analysis is mostly concerned with factors influencing house prices over time at an economy-wide level, e.g. per capita GDP, interest

rate on loans, unemployment inflation, returns in the stock exchange (Adams and Füss, 2010; Bouchouicha and Ftiti, 2012; Ferrara and Koopman, 2010; Brunnermeier and Julliard; 2008).

In the case of Cyprus the literature on how property prices are estimated and which factors affect their evolution is very limited (Pashardes and Savva, 2009; Theodosiou and Thoukididis, 2012; International Monetary Fund, 2014). The most widely known (and used) property price indices are the residential ones published by the Central Bank of Cyprus, in collaboration with the Association of Cyprus Banks. The indices are published quarterly and are based on property valuation data received from independent property surveyors in connection with mortgage transactions, such as housing loans and mortgage information. The research described in this paper aims at enhancing the existing knowledge on property price behaviour in Cyprus by:

(a) building a new database, using newspaper advertisements of monthly prices and related information about various types of property (houses, flats, plots etc) in different districts of Cyprus over the post-2000 period;

(b) developing scientifically appropriate models for the estimation of property price indices that can provide a measure of the quarterly change in property prices, together with an assessment of the reliability of this measure;

(c) setting up econometric models for the analysis of the factors (property characteristics and macroeconomic variables) which affect property prices; and

(d) developing econometric models for the systematic estimation of projections for the future evolution of property prices.

We shall refer to the index resulting from undertaking steps (a)-(d) as the Cyprus Economic Research Centre (CypERC) property price index. This index can add to knowledge about the movements of property prices in Cyprus and contribute to more evidence-based decisions in both the private and public sectors of the economy. In particular, the systematic measurement of property prices and their outlook via the construction of specialised indices can, inter alia:

- lead to households and firms knowing more about changes in the current value of property, thereby helping them to be better informed participants in the real estate market;
- provide commercial banks and other financial institutions with valuable information for identifying the risk exposure of their portfolios and assessing the levels of capitalisation needs; and

- assist central and local government policy-makers in the design, implementation, monitoring and assessment of property taxation schemes and, in general, property market policies.

The ultimate objective of the property price research at CypERC is to publish a quarterly bulletin reporting price indices for different types of property and different districts of Cyprus, and examine the determinants and outlook of these indices. The current paper simply serves as an in-depth documentation of the sampling methods and estimation techniques, as well as the analysis of the determinants and future projections of property prices in Cyprus.

The structure of the paper is as follows: Section II describes the data sources and sampling methods used for the construction of the CypERC database of property prices. Section III presents the econometric model used for the estimation and validation of price indices of various types of properties and in different districts. Section IV describes the model used for the estimation of (and preliminary results obtained for) the effect of micro- and macro-economic variables on property prices in Cyprus. Section V describes the methods used for forecasting the evolution of property price indices and illustrates their performance through a forecasting exercise.

II. DATA SAMPLING

II.1 Data sources

The property prices used in this paper are those advertised in newspapers. These, of course, are prices asked by sellers; therefore, the CypERC property price index should be seen as an 'asking price' index. As such it can reflect prices that are likely to be higher than the prices finally agreed with buyers. This, however, is of no consequence when the objective is to investigate not the level but the changes in property prices over time.[1] In fact, using asking property prices has a 'lead' advantage, as the prices finally agreed between the buyer and seller can take a long time to be realised (i.e. the time between placing a property in the market and the completion of the sale).

[1] Normally, there are no reasons to expect the difference between the asking and agreed property prices to change over time. Of course, if one is interested in the level of prices at which property sales are completed, the difference between asking and sale prices can be estimated and the CypERC index adjusted accordingly.

The property prices and related information were collected from the widely circulated Greek language newspapers Philelefttheros, Politis and Chryses Efkeries; and the English language newspaper Cyprus Mail. The inclusion of newspapers addressed to both Greek and English language readers is thought to be necessary in order to take into account developments in property prices involving not only domestic but also foreign market participants. The sampling units are residential (flats and houses) and non-residential (plot and land) property.

In order to achieve a balanced coverage of the information within a month, the first and third week of each month is sampled. The Sunday issues for daily newspapers and the issue on the circulation day for weekly newspapers are selected. Variations of the sampling date were allowed in cases where no publication was released (New Year's Day, Easter Sunday, Labour day and the Assumption day); or whenever the advertisements' section of an issue did not have enough properties for sale. For these cases the following procedure was employed.

- For the daily newspapers we sampled the next available date following the sequence:
  - one day before (Saturday) the primary sampling date,
  - one day after (Monday),
  - two days before (Friday),
  - two days after (Tuesday), and
  - the following week (Sunday).
- For the weekly newspapers we sampled the next available day the newspaper was in circulation, sometimes the next day or, otherwise, the following week.

Our records consist of copies of the newspapers' sections that contain advertisements of properties (residential and plot/land) for sale. Table A1 and A2 in Appendix A show the newspapers collected and currently included in our archive.[2]

II.2 Property types

The selection of observations for our property prices sample is guided by the need to balance the objective of including as many property types as possible

[2] When a newspaper is not available, or does not have the appropriate information, the next sampled newspaper, according to the procedure outlined above, is used. Access to the newspaper is achieved via the internet and the archives of the Press and Information Office for previous years. Hard copies of the advertisements are kept.

with the need to maintain the representation of the property types in the sample constant over time, in order to avoid mistaking changes in property types from one sample period to the next (e.g. large houses in one month followed by small flats in the next) as changes in property prices. For this reason we have excluded from the sample properties for which advertisements in the newspapers are very few and far between, especially at district level, such as houses with five or more rooms or land for commercial use.

Thus, in the case of residential properties the observations selected for inclusion in the sample cover the most popular house and flat types grouped as follows:

(i) houses of up to three rooms,

(ii) houses of four rooms,

(iii) studios and one-room flats,

(iv) flats with two rooms, and

(v) flats with three rooms.[3]

In the case of plot/land properties the observations selected for inclusion in the sample cover:

(i) plot (lot with permission to erect a building – in Greek 'οικόπεδο',

(ii) land for agricultural use with permission for (limited) human settlement – in Greek 'οικιστικό χωράφι', and

(iii) land for agricultural use without human settlements – in Greek 'αγροτικό χωράφι'.

For brevity, thereafter we shall refer to (ii) as 'settleable land' and to (iii) as 'agricultural land'.

II.3 Sampling

The frequency of observations for each property type and district (Nicosia, Larnaca, Limassol, Famagusta and Paphos) in our sample is proportional to its frequency in the population, as defined by the total number of property advertisements in the selected newspapers at district level. This was determined

[3] In addition to creating irregularities, another problem with including not so popular properties (e.g. one or two bedroom houses, five bedroom flats etc.) in our sample is the lack of clarity about important characteristics of such properties. For instance sellers of large houses tend to report rooms instead of bedrooms. Similar ambiguities arise for plots and land rarely found in newspaper advertisements (e.g. for commercial use).

by performing two separate counting exercises, one for residential properties and one for plot/land. In these exercises we counted the number of property advertisements in newspapers by district and type for selected years in the sample. Then, the resulting counts were combined, whenever available, with information from the Department of Land and Surveys, to determine the proportion of observations to be sampled from each district and type.

II.3.a Residential properties

For the counting exercise of house/flat advertisements we sampled Philelefttheros, Politis, Cyprus Mail, and Chryses Efkeries.[4] We recorded a total of 23806 advertisements from sampling the periods April and October of 2001, 2003, 2005, 2007, 2009, and 2011. Table II.1 reports the statistics from the counting exercise.

Table II.1: Frequency of residential property advertisements by district and type

	House			Flat			Total	
	Number	Percent		Number	Percent		Number	%
		Distr.	Type		Distr.	Type		
Nicosia	5,437	44.5	46.0	6,773	55.5	56.5	12,210	100
Larnaca	1,785	47.7	15.1	1,954	52.3	16.3	3,739	100
Limassol	3,552	58.9	30.0	2,482	41.1	20.7	6,034	100
Paphos	537	60.5	4.5	351	39.5	2.9	888	100
Famagusta	515	55.1	4.4	420	44.9	3.5	935	100
Total	11,826	49.7	100	11,980	50.3	100	23,806	100

Source: Newspapers Philelefttheros, Politis, Cyprus Mail and Chryses Efkeries

As seen from Table II.1, the district of Nicosia has by far the largest share of houses and flats in the total number of advertisements in the aforementioned newspapers (46% of houses and 56.5% of flats), followed by Limassol (30% of houses and 20.7% of flats), and Larnaca (15.1% of houses and 16.3% of flats); whereas, Famagusta and Paphos are represented in the total number of advertisements by much smaller percentages (together account for 8.9% of houses and 6.4% of flats).

Table II.1 also shows the distribution of property types by district. For Cyprus as a whole, the total number of advertised houses and flats is very close: 11,826

[4] Additional data for the sales and transfers by district are obtained from the Department of Lands and Surveys of Cyprus.

houses and 11,980 flats. There are however notable deviations from this 'fifty-fifty' number between districts. For instance, there are more flats than houses in Nicosia (55.5% vs 44.5%); and the same is also true for Larnaca (52.3% vs 47.7%). In contrast, the number of flats is smaller than the number of houses in Limassol (41.1% vs 58.9%), Paphos (39.5% vs 60.5%) and Famagusta (44.9% vs 55.1%).

Table II.2 reports the frequencies of different property types by district and number of rooms. Again, some marked differences are seen between districts. For instance, relatively large houses are more frequently located in Limassol (28.1% of total properties) and Nicosia (25% of total properties) than in other districts. Also important to note in the same table is that houses are more or less equally distributed between the ≤3- and 4-room categories (25% and 22.2% of total properties, respectively); whereas, in the case of flats, the percentage of total properties is 10.5% for flats with ≤1 rooms, 22.7% for flats with 2 rooms and 17.1% for flats with ≥3 rooms.

Table II.2: Frequency of advertisements of residential property types by district and room number

Types:	Houses				Flats						Total	
Rooms:	≤ 3		4		≤ 1		2		≥ 3			
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Nicosia	2,380	19.5	3,057	25.0	1,466	12.0	2,916	23.9	2,391	19.6	12,210	100
Larnaca	1,058	28.3	727	19.4	387	10.4	1,024	27.4	543	14.5	3,739	100
Limassol	1,856	30.8	1,696	28.1	459	7.61	1,069	17.7	954	15.8	6,034	100
Paphos	409	46.1	128	14.4	87	9.8	175	19.7	89	10.0	888	100
Famagusta	358	38.3	157	16.8	102	10.9	227	24.3	91	9.7	935	100
Total	6,061	25.5	5,765	24.2	2,501	10.5	5,411	22.7	4,068	17.1	23,806	100

Source: Newspapers: Philelefheros, Politis, Cyprus Mail and Chryses Efkeries

Setting the number of observations in the sample to 48 per month (144 per quarter), on the basis of the distribution of residential properties in the population reported in Tables II.1 and II.2, our sampling by district and type of property is as presented in Table II.3. The main objective achieved by this sampling is representativeness of the distribution of properties in the total number of advertisements in the newspapers; with a small bias in favour of districts with a small number of observations (Paphos and Famagusta), placed by the restriction that at least one observation per month for each type of property should be collected from a district.

Furthermore, while the number of monthly observations per type in each district may appear small, it should be emphasised that:

(i) price indices will be constructed either by district *or* (not and) by property type; and

(ii) the change in property prices will be analysed on a quarterly basis.

Thus, the district price indices will have a minimum of 18, and the property type indices a minimum of 21 observations in each quarterly cell.

Table II.3: The sample of residential properties by district and type

	Monthly						Quarterly					
Type:	Houses		Flats			Total	Houses		Flats			Total
Rooms:	≤ 3	4	≤ 1	2	3		≤ 3	4	≤ 1	2	3	
Nicosia	5	3	2	3	3	16	15	9	6	9	9	48
Larnaca	2	2	1	2	1	8	6	6	3	6	3	24
Limassol	3	3	2	2	2	12	9	9	6	6	6	36
Famagusta	2	1	1	1	1	6	6	3	3	3	3	18
Paphos	2	1	1	1	1	6	6	3	3	3	3	18
Total	14	10	7	9	8	48	42	30	21	27	24	144

II.3.b Plot/land properties

The procedure followed for the sampling of plot/land properties is based on the same principles as the one for residential properties. Namely, first the distribution of land/plot properties in the population (advertisements in the newspapers) is determined; and then a number of observations are collected so that each type of property in each district is proportional to the corresponding number in the population.[5]

The plot/land population is determined using the newspaper advertisements in April and October of 2006 and 2011. The total number of plot/land properties advertised during these four periods is 5765 and is distributed as shown in Table II.4. As seen from this table, there is almost an equal split between plots and land for sale (49.85% and 50.15%, respectively). The picture of equal split between plots and land is also relatively similar across districts, with the exception of Paphos, where plots represent 33% and land 67% of the total number of plot/land advertisements in the newspapers. Another feature of the distribution of the plot/land properties is the very small share of Famagusta (and, to a lesser extent, Paphos) in the total number of advertisements of these property types.

[5] Cyprus Mail is excluded for land and plot sales due to: (i) the ambiguity of the various terms used to describe the property for sale, i.e. the words 'plot', 'land', and 'land of plot' are, among other, used interchangeably; and (ii) the fact that very few (if any) advertisements of land appear in the newspaper in question.

Table II.4: Frequency of advertisements of plot/land property by district and type

	Plots			Land			Total	
	Number	Percent		Number	Percent		Number	%
		Distr.	Type		Distr.	Type		
Nicosia	1,385	52.8	48.2	1,236	47.2	42.8	2,621	100
Larnaca	373	46.3	13.0	432	53.7	14.9	805	100
Limassol	980	50.0	34.1	979	50.0	33.9	1,959	100
Famagusta	33	48.5	1.2	35	51.5	1.2	68	100
Paphos	103	33.0	3.6	209	67.0	7.2	312	100
Total	2,874	49.8	100	2,891	50.2	100	5,765	100

Source: Newspapers: Phileleftheros, Politis and Chryses Efkeries.

It should be noted that advertisements of land for sale in the newspapers are not homogeneous and include land for agricultural, settlement, commercial or industrial use, as well as land for gardening and other plant growing purposes. However, several of these land categories (e.g. commercial use and gardening) are very small in number and rarely advertised for sale in the newspapers. This phenomenon is especially observed in Famagusta and Paphos. For this reason we have decided to include in the sample the two most popular types of land: agricultural and settleable, as defined previously (section II.1). Together, these two types of land account for 83.4% of all land advertisements in newspapers and the expectation is that their price changes are representative of the price changes of all types of land. This is a standard practice in sampling for the estimation of price indices in general; and rationalised by the fact that items with a very small weight in the population cannot have a discernible effect on the overall price index, even when their price changes deviate from the norm.

Table II.5 reports the number of observations of agricultural and settleable land by district and usage. Overall, slightly more settleable land is advertised in the newspapers than land for agricultural use (57.6% vs 42.4%). The distribution of land by these two usages, however, is not uniform across districts: for Larnaca and Paphos is close to the mean; for Nicosia is 49.6% settleable and 50.6% agricultural; for Famagusta is 52.6% settleable and 47.4% agricultural; and for Limassol 74.6% settleable and 25.4% agricultural.

Table II.5: Frequencies of advertisements of land by district and usage

	Agricultural		Settleable		Total	
	Number	%	Number	%	Number	%
Nicosia	319	50.6	311	49.4	630	100
Larnaca	86	42.2	118	57.8	204	100
Limassol	81	25.4	238	74.6	319	100
Famagusta	9	47.4	10	52.6	19	100
Paphos	31	44.3	39	55.7	70	100
Total	526	42.4	716	57.6	1,242	100

Source: Newspapers: Phileleftheros, Politis and Chryses Efkeries.

The total number advertisements sampled for the purposes of estimating the price index of plot/land is set to 50 per month and is allocated between districts and types (plots, agricultural land and settleable land) on the basis of the weights implied by Tables II.4 and II.5. The resulting number of monthly and quarterly observations for different types of plot/land property in the sample is reported in Table II.6.[6]

Table II.6: The sample of plot/land properties by district and type

	Monthly				Quarterly			
	Plots	Land		Total	Plots	Land		Total
		Agr/ral	Set/ble			Agr/ral	Set/ble	
Nicosia	11	5	5	21	33	15	15	63
Larnaca	3	2	2	7	9	6	6	21
Limassol	9	2	6	17	27	6	18	51
Famagusta	1	0	1	2	3	0	3	6
Paphos	1	1	1	3	3	3	3	9
Total	25	10	15	50	75	30	45	150

A remark that can be made here about the figures presented in Table II.6 is the small number of observations of plot/land property advertised for sale in Famagusta and Paphos: 6 and 9 per quarter, respectively. The reliability of changes in plot/land prices estimated with such a small number of observations is questionable. Although this problem can be somehow ameliorated in the context of the econometric analysis used is this paper (and described in the next section) because all estimated prices changes are assessed for their reliability

[6] As the number of land observations was too small for Famagusta to be included in the sample, we subtracted one observation from each land category in Nicosia and added it to the respective category in Famagusta.

(statistical significance), we have decided to group these two districts together and construct one plot/land property price indices for the two districts in question.

II.4 Collected information

The information collected for each residential property includes:

- asking price[7],
- area (for houses the area of the plot is also included, if available),
- type of unit (detached or semi-detached house, flat),
- number of rooms,
- district (and any additional information on location),
- month and year of the advertisement,
- whether the unit is new or used, and
- whether the price includes VAT.

The information to be collected for each plot/land unit includes:

- asking price,
- area,
- type of unit (plot or land),
- district (and any additional information on location),
- month and year of the advertisement,
- building and coverage factors, and
- whether the land is agricultural or settleable.

Table II.7 reports selected statistics of the sample covering the period 2000Q1 - 2014Q4 for the residential properties and the period 2005Q1 - 2014Q4 for the plot/land properties.[8]

- In the case of residential properties the total number of observations over this period is 8500, the mean price around 200 thousand euro, the mean size in square meters 148 and the mean number of rooms 2.7. Furthermore, 31% of the collected properties are new, 13% are in Famagusta, 17% in Larnaca, 25% in Limassol, 33% in Nicosia and 12% in Paphos. As said earlier in this section, residential properties are more

[7] On January 1, 2008 Cyprus joined the euro area. All prices that were reported in Cyprus pounds were converted into euros using the following exchange rate: CYP 1 = EUR 1.708601.

[8] These statistics are calculated after the removal of outliers and the estimation of missing values for the area of the structure, as described in the following sub-sections.

or less equally split between houses and flats; and Chryses Efkeries accounts for 36% of observations, followed by Cyprus Mail (27%), Philelefthеros (26%) and Politis (11%).

- In the case of plot/land properties the total number of observations over the aforementioned period is 5797, the mean price 290 thousand euro and the mean size in square meters 5900, including both plots and land. Furthermore, 4% are in Famagusta, 14% in Larnaca, 34% in Limassol, 41% in Nicosia and 5% in Paphos. Properties are more or less equally split between plots and land; and Chryses Efkeries accounts for 64% of observations, followed by an equal percentage of 17% for each of the two remaining collected newspapers, Philelefthеros and Politis.

Table II.7: Sample statistics (2000-2014)

	Observations		Mean		Std. Deviation		Minimum		Maximum	
Variables	Resid-ential	Plots-land	Resid-ential	Plots-land	Resid-ential	Plots-land	Resid-ential	Plots-land	Resid-ential	Plots-land
Price (in thousands)	8500	5797	199	290	151	464	4.7	3.8	1800	14500
Area of structure (sq.m.)	8500	N/A	148	N/A	77	N/A	25	N/A	900	N/A
Area of plot (sq.m.)	660	N/A	677	N/A	1056	N/A	68	N/A	10500	N/A
Area (sq.m., in thousands)	N/A	5797	N/A	5.9	N/A	118.6	N/A	0.13	N/A	6263
Number of rooms	8500	N/A	2.7	N/A	0.98	N/A	0	N/A	4	N/A
New	7279	N/A	0.31	N/A	0.46	N/A	0	N/A	1	N/A
Famagusta	8500	5797	0.13	0.04	0.33	0.19	0	0	1	1
Larnaca	8500	5797	0.17	0.14	0.37	0.34	0	0	1	1
Limassol	8500	5797	0.25	0.34	0.43	0.47	0	0	1	1
Nicosia	8500	5797	0.33	0.41	0.47	0.49	0	0	1	1
Paphos	8500	5797	0.12	0.05	0.33	0.23	0	0	1	1
House	8500	N/A	0.47	N/A	0.50	N/A	0	N/A	1	N/A
Semi-detached house	8500	N/A	0.03	N/A	0.16	N/A	0	N/A	1	N/A
Flat	8500	N/A	0.50	N/A	0.50	N/A	0	N/A	1	N/A
Plot	N/A	5797	N/A	0.50	N/A	0.49	N/A	0	N/A	1
Land	N/A	5797	N/A	0.49	N/A	0.49	N/A	0	N/A	1
Settleable	N/A	3486	N/A	0.67	N/A	0.46	N/A	0	N/A	1
Agricultural	N/A	3486	N/A	0.32	N/A	0.46	N/A	0	N/A	1
Coverage factor	N/A	381	N/A	41.9	N/A	16.6	N/A	0.5	N/A	100
Building factor	N/A	2950	N/A	61.5	N/A	35.5	N/A	1.2	N/A	180
Filelefthеros	8500	5797	0.26	0.17	0.44	0.37	0	0	1	1
Cyprus Mail	8500	N/A	0.27	N/A	0.44	N/A	0	N/A	1	N/A
Politis	8500	5797	0.11	0.17	0.31	0.38	0	0	1	1
Chryses Efkeries	8500	5797	0.36	0.64	0.48	0.47	0	0	1	1

Source: Newspapers: Philelefthеros, Politis, Cyprus Mail and Chryses Efkeries.

A question regarding the residential properties is whether the average size of house/flat and plot/land units has changed over time. For example, as seen in Graph II.1 there is a small decline in the square metres of both houses and flats over the period 2000 and 2014 in Cyprus.

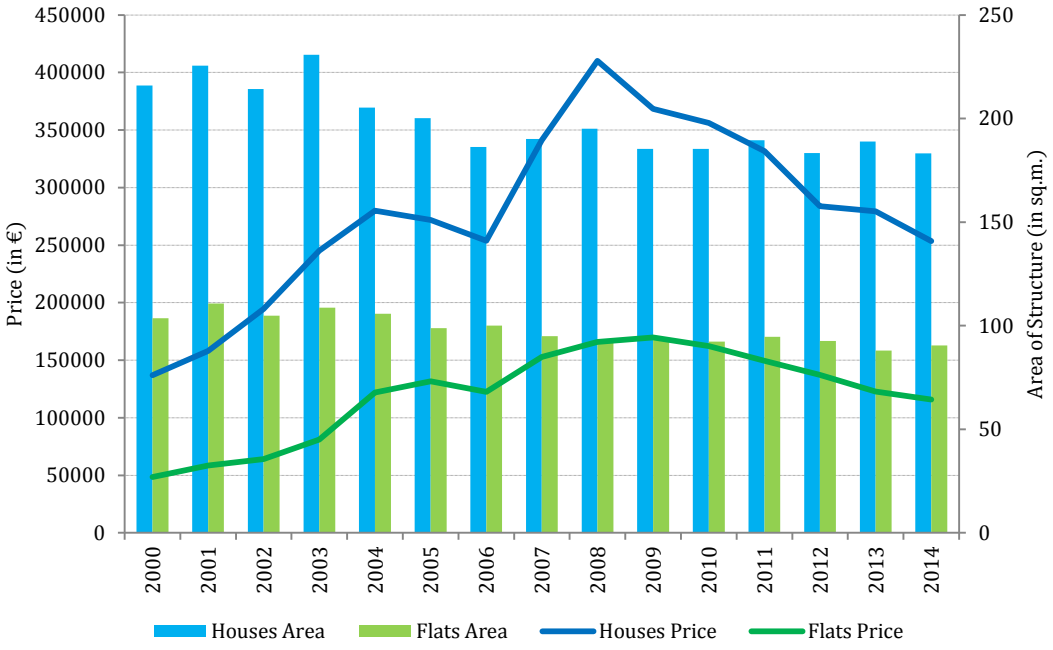
This problem can be solved in two ways:

(i) estimate changes in properties per square metre, or

(ii) consider the property type (houses with up to three rooms, houses with four rooms etc) to be unit of analysis and estimate price changes controlling for changes in the square metres of the property.

In the case of both residential and plots/land property we adopt the latter approach. Thus, the estimated price changes over time pertain to property types with the same number of square metres.

Graph II.1: Average price and area for flats and houses



II.5 Removal of outliers

The need to remove outliers from the sample arises due to the rather small number of observations of some property types at district level and the large price heterogeneity observed in some districts. For instance, houses for sale in Limassol can exceed three million euro so that the estimated mean price change

can be affected from these properties entering or exiting the sample rather than from changes in the price of properties themselves.

To remove outliers from the residential sample we follow the standard statistical practice of excluding observations with three or more standard deviations from the mean. This is done separately for each quarter and each residential property type (i.e. houses with up to three rooms, houses with four rooms, studios and flats with one room, flats with two rooms and flats with three rooms). The discarded observations are then replaced with new ones of the same property type and in the same district. The presence of outliers is then re-checked and the same procedure is repeated until the number of observations excluded as outliers is below 2% of those allocated to the particular quarter in the sample.[9] Following this procedure 123 residential properties are removed as outliers over the period 2000Q1 to 2014Q4.

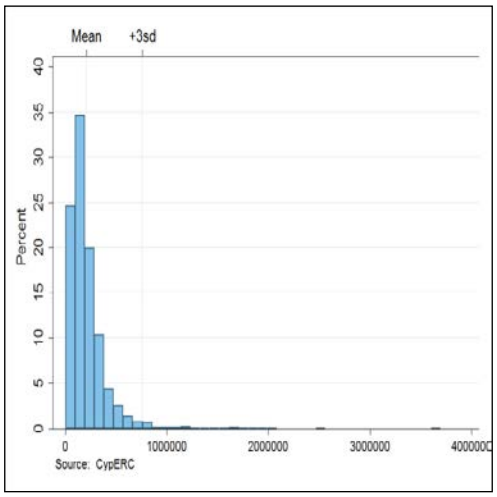
In the plot/land sample, due to greater heterogeneity among the various land properties, the procedure followed is slightly different. In particularly, to remove outliers from the plot/land sample we exclude observations that are equal to or above the mean price per square meter by (a) three standard deviations for plots and (b) two standard deviations for land. This procedure is used separately for each quarter. Also, to account for the greater heterogeneity among the advertised land properties, the removal of outliers is applied separately for settleable and agricultural land. Overall, following the procedure described above, 203 properties are removed as outliers over the period 2005Q1 to 2014Q4 in the plot/land sample.

A picture about how the procedure for removing outliers, which is described above, has affected the distribution of residential property prices in the sample is depicted in the Graph II.2. Similarly, graph II.3 shows the distribution of prices for the plot/land sample before and after the removal of extreme values.

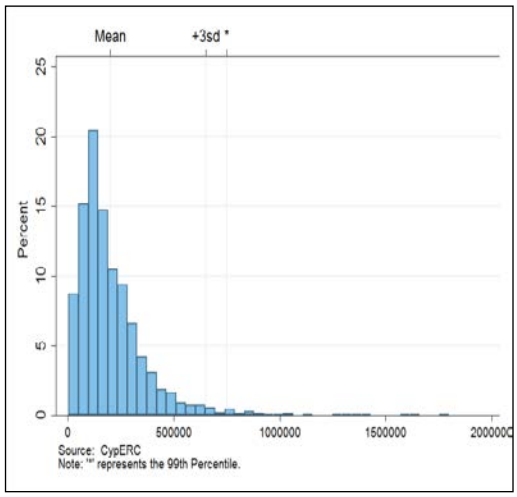
[9] In particular, as mentioned earlier 144 residential units area included in each quarter. Thus, the procedure for excluding outliers should at worst reduce this number to 142.

Graph II.2: Distribution of residential property prices (2000Q1-2014Q4, in euro)

(a) before the removal of outliers



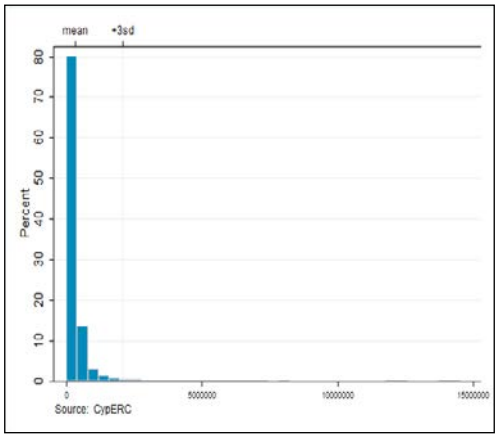
(b) after the removal of outliers



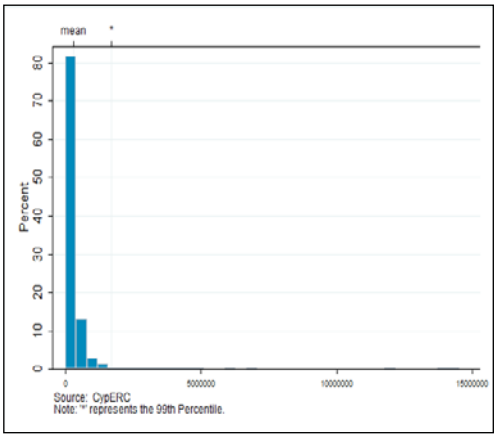
Source: Author calculations.

Graph II.3: Distribution of plot/land property prices (2005Q1-2014Q4, in euro)

(a) before the removal of outliers



(b) after the removal of outliers



II.6 Missing observations[10]

In order to comply with the sampling rules described earlier in this section, we have to occasionally collect advertisements of residential properties that do not report the area of their structure. For these observations the missing area is predicted from the following (hedonic) equation, which is estimated using the observations in the sample that contain this information,

$$\ln A_{i(t)} = \alpha_1 \ln p_{i(t)} + \alpha_2 \left(\ln p_{i(t)}\right)^2 + \alpha_3 R_{i(t)} + \alpha_4 \left(R_{i(t)}\right)^2 + \sum_{t=1}^{T} \beta_t \, Q_{i(t)} + \sum_{k=1}^{K-1} \gamma_k \, D_{i(t)}^{k} + \sum_{m=1}^{M-1} \delta_m \, U_{i(t)}^{m} + \varepsilon_t,$$

where:

$A_{i(t)}$ denotes the area of the property (square metres),

$p_{i(t)}$ the observed asking price (in euro) of property i in quarter t,

$R_{i(t)}$ the number of rooms of property i in quarter t, and

$Q_{i(t)}$, $D_{i(t)}^{k}$ and, $U_{i(t)}^{m}$ denote three sets of dummy variables for quarters, districts and property types, respectively.

The missing area (rounded to the closest integer) is filled with the (exponential of the) fitted values obtained from the equation above for 1340 residential properties in the sample (8500 observations). Some statistics comparing the actual with the estimated area values are shown in Table II.8 below.

Table II.8: Descriptive Statistics for the Area of the Structure

Variable	Obs	Mean	Std. Dev.	Min	Max
Actual	7,160	154.00	79.15	25	900
With fitted values	8,500	145.18	66.58	27	461

Source: Author calculations.

Notably, the mean area of residential properties is lower when the fitted values of squared meters are also included in the sample. This is not surprising because

[10] The estimation of missing area is performed: (i) every time a new quarter is included in the sample; (ii) only for the missing area of observations in this quarter (i.e. the fitted area in the past data is treated as actual); and (iii) for estimating the missing area of residential properties. The missing area problem does not arise in the case of plot/land properties because the area is almost always included in advertisements for the sale of these properties.

the residential properties which are advertised for sale without mentioning the number of their square meters are more likely to be those with a relatively smaller area compared to other properties of similar type**.**

III. ESTIMATION OF PROPERTY PRICE INDICES

This chapter describes the methods used for the estimation of price indices for different types of property and for different districts. This estimation is essentially based on the so called hedonic analysis, where one tries to associate the property price with its main characteristics such as the type of property, size, location etc.

The methodology used in our analysis is guided by the need to extract as much information as possible from the data, given that the sample we use can be rather small for certain types of properties in some districts (e.g. agricultural land in Paphos or Famagusta). Furthermore, it enables one to obtain the property price indices together with their statistical significance, so as to have a measure of reliability associated with them. The changes shown by the property price indices are quarterly and are estimated separately for residential and land properties.

III.1 Property price model

The equation used for the estimation of the property prices has the hedonic form

$$\ln p_{i(t)} = \alpha_0 + \alpha_1 \ln A_{i(t)} + \sum_{t=1}^{T} \beta_t \, Q_{i(t)} + \sum_{k=1}^{K-1} \gamma_k \, D_{i(t)}^{k} + \sum_{m=1}^{M-1} \delta_m \, U_{i(t)}^{m} +$$

$$+ \sum_{t=1}^{T} \sum_{k=1}^{K-1} \theta_{tk} \, Q_{i(t)} D_{i(t)}^{k} + \sum_{t=1}^{T} \sum_{m=1}^{M-1} \rho_{tm} \, Q_{i(t)} U_{i(t)}^{m} + \sum_{m=1}^{M-1} \varphi_m \, U_{i(t)}^{m} \ln A_{i(t)} + e_{i(t)} \quad (3.1)$$

where $\ln p_{i(t)}$, the dependent variable, is the logarithm of the observed asking price (in euro) of property i in quarter t;[11] while the Greek lowercase letters in the equation are parameters each capturing the effect of the following variables:

$Q_{i(t)}$ takes the value one if the observation refers to quarter t and zero otherwise,

$D_{i(t)}^{k}$ takes the value one if the observation refers to district k and zero otherwise,

[11] For each quarter $t = 0,1,2,..,T$ there are $n(t)$ property prices in the sample ($i = 1(t), 2(t), \dots, n(t)$) and in total $T + 1$ quarters are considered, with $t = 0$ being the first quarter in the sample.

$U_{i(t)}^{m}$ takes the value one if the observation refers to property type m and zero otherwise,

$A_{i(t)}$ is the area of the property (in square metres);

the random error term of the model is given by $e_{i(t)}$.

Note that the dummy variables $D_{i(t)}^{k}, U_{i(t)}^{m}$, are allowed to interact with $Q_{i(t)}$, so for a given quarter we estimate a separate price index for each type of property in each district.[12]

The model parameters, as said above, are denoted by Greek lowercase letters and represent the percentage effects of each variable on the property price. For example β_t, γ_k, δ_m capture time, district and type percentage effects on price respectively; θ_{tk} and ρ_{tm} measure how the percentage impact of district and type on price, respectively, changes over quarters.

III.2 Estimation

Equation (3.1) is quite general in the sense that a number of sub-indices for different property types in the various districts can be constructed.[13] This sub-section reports results obtained from the estimation of (3.1) by Ordinary Least Squares (OLS) and using data for residential properties, and plot/land properties in separate estimation exercises.

III. 2a Property price index by district and property type

The log price of property type m in district k and time t can be computed using the predicted values obtained from equation (3.1) for $D_{i(t)}^{k} = 1$ and $U_{i(t)}^{m} = 1$ for all values of i and t, that is

$$\ln p_{(t)} = \hat{\alpha}_0 + \hat{\alpha}_1 \overline{\ln A} + \hat{\beta}_t + \hat{\gamma}_k + \hat{\delta}_m + \hat{\theta}_{tk} + \hat{\rho}_{tm} + \hat{\varphi}_m \overline{\ln A} \qquad (3.2)$$

where $\overline{\ln A}$ is the average value of the area (in logarithm) for property type m in district k.

---

[12] For every set of dummy variables (i.e. $T+1$, K, M quarter, district and property type dummy variables, respectively) one variable is excluded from the model, so the estimated parameters are interpreted as differences for the excluded quarter, district or property type.

[13] As explained in the previous section, the sampling process adopted is based on the population weights so that the data collected are representative of the distribution of property prices over districts and types in the country. Nevertheless, the proposed methodology can be also applied to cases where the sample weights differ from the population ones simply by using Weighted Least Squares (WLS) instead of OLS.

The price index of property type m in district k for time t can then be is computed by dividing the fitted values $p_{(t)}$ in each quarter by those corresponding to the quarter chosen as reference (base) quarter, e.g. $t = 0$,

$$P_{km(t)} \equiv \frac{p_{(t)}}{p_{(0)}} = exp\left(\hat{\beta}_t + \hat{\theta}_{tk} + \hat{\rho}_{tm}\right), \quad for \ t = 0,1 \dots, T, \tag{3.3}$$

The price index is, therefore, defined by the estimated time (quarter), district and property type parameters.

III. 2b Grouped indices

Aggregate price indices, can be computed by estimating equation (3.1) including only the dimensions over which the index is defined, i.e. exclude the dummies for which we wish the index to be aggregated. Below we show how the property price index is estimated for each district, each property type and for the country as a whole.

Property price index for each district:

Estimate equation (3.1) imposing the restrictions $\rho_{tm} = 0$ and $\delta_m = 0$ for all values of m and t, i.e.

$$\ln p_{i(t)} = \alpha_0 + \alpha_1 \ln A_{i(t)} + \sum_{t=1}^{T} \beta_t \, Q_{i(t)} + \sum_{k=1}^{K-1} \gamma_k \, D_{i(t)}^{k} + \sum_{t=1}^{T} \sum_{k=1}^{K-1} \theta_{tk} \, Q_{i(t)} D_{i(t)}^{k} +$$

$$+ \sum_{m=1}^{M-1} \varphi_m \, U_{i(t)}^{m} \ln A_{i(t)} + \varepsilon_{i(t)} \tag{3.4}$$

and then compute the property price index in quarter t for each district k,

$$P_{k(t)} \equiv \frac{p_{(t)}}{p_{(0)}} = \exp\left(\tilde{\beta}_t + \tilde{\theta}_{tk}\right) \quad \text{for } t = 0, 1, \dots, T \tag{3.5}$$

Property price index for each property type:

Estimate equation (3.1) imposing the restrictions $\theta_{tk} = 0$ and $\gamma_k = 0$ for values of k and t, i.e.

$$\ln p_{i(t)} = \alpha_0 + \alpha_1 \ln A_{i(t)} + \sum_{t=1}^{T} \beta_t \, Q_{i(t)} + \sum_{m=1}^{M-1} \delta_m \, U_{i(t)}^{m} + \sum_{t=1}^{T} \sum_{m=1}^{M-1} \rho_{tm} \, Q_{i(t)} U_{i(t)}^{m} +$$

$$+ \sum_{m=1}^{M-1} \varphi_m \, U_{i(t)}^{m} \ln A_{i(t)} + \eta_{i(t)} \tag{3.6}$$

and then compute the property price index in quarter t for each property type m,

$$P_{m(t)} \equiv \frac{p_{(t)}}{p_{(0)}} = \exp\left(\breve{\beta}_t + \breve{\rho}_{tm}\right), \quad \text{for } t = 0, 1, \dots, T \tag{3.7}$$

Aggregate property price index:

Estimate equation (3.1) imposing the restrictions $\rho_{\mathrm{tm}} = 0$, $\delta_{\mathrm{m}} = 0$, $\theta_{tk} = 0$ and $\gamma_k = 0$ for all values of k, m and t i.e.

$$\ln p_{i(t)} = \alpha_0 + \alpha_1 \ln A_{i(t)} + \sum_{t=1}^{T} \beta_t Q_{i(t)} + \sum_{m=1}^{M-1} \varphi_m U_{i(t)}^{m} \ln A_{i(t)} + \upsilon_{i(t)} \tag{3.8}$$

and then to compute the property price index in quarter t,

$$P_{G(t)} \equiv \frac{p_{(t)}}{p_{(0)}} = \exp\left(\breve{\beta}_t\right),$$

for $t = 0, 1, \dots, T$ (3.9)

Smoothing

Once the price index - aggregate, district and property type - is estimated for each quarter as described above, we construct a four-period moving average (MA4) series in order to smooth 'spikes' in the data that arise from the small sample size and, possibly, seasonality. The smoothed index is given by

$$\bar{P}_{j(t)} = \frac{1}{4}\left(P_{j(t)} + P_{j(t-1)} + P_{j(t-2)} + P_{j(t-3)}\right)$$

, for $t \geq 3$ (3.10)

where $j = k, m, G$ denoting the district, type and aggregate index respectively.

III.3 Validation checks

The above method can also generate confidence intervals for the values of the estimated price indices, as the latter are obtained from parameters estimated with (heteroskedasticity and autocorrelation robust) regression methods. This is done by using the variance-covariance of the standard errors of these parameters estimators. Furthermore, hypothesis tests of the statistical significance of the changes of property price indices over different dimensions (time, district, type) can be performed.[14]

[14] In some cases the computation of sub-indices (e.g. for specific property type in a given district) is based on a relatively small number of observations and their reliability might be limited.

More specifically, a question of particular interest is how reliable are the estimated changes in the property price index (a) from one quarter to the next, and (b) from one quarter in a given year to the same quarter in the following year. To answer this question we estimate the statistical significance of these changes as follows.

The percentage change of the MA4 index at quarter *t* from *t-s*, where *s=1* or *s=4* is given by

$$\Delta \ln \bar{P}_{j(t)} = \ln\left[\frac{\bar{P}_{j(t)}}{\bar{P}_{j(t-s)}}\right] =$$

$$= \ln\left(P_{j(t)} + P_{j(t-1)} + P_{j(t-2)} + P_{j(t-3)}\right) - \ln\left(P_{j(t-s)} + P_{(t-s-1)} + P_{(t-s-2)} + P_{(t-s-3)}\right),$$

where $j = k, m, G$.

In the case where the statistical significance is tested for the percentage change in the price index of district *k* at quarter *t* from *t-s*

$$\Delta \ln \bar{P}_{k(t)}$$
$$= \ln\left(\frac{exp\left(\tilde{\beta}_t + \tilde{\theta}_{tk}\right) + exp\left(\tilde{\beta}_{t-1} + \tilde{\theta}_{(t-1)k}\right) + exp\left(\tilde{\beta}_{t-2} + \tilde{\theta}_{(t-2)k}\right) + exp\left(\tilde{\beta}_{t-3} + \tilde{\theta}_{(t-3)k}\right)}{4}\right)$$
$$- \ln\left(\frac{exp\left(\tilde{\beta}_{t-s} + \tilde{\theta}_{(t-s)k}\right) + exp\left(\tilde{\beta}_{t-s-2} + \tilde{\theta}_{(t-s-2)k}\right) + exp\left(\tilde{\beta}_{t-s-3} + \tilde{\theta}_{(t-s-3)k}\right) + exp\left(\tilde{\beta}_{t-s-4} + \tilde{\theta}_{(t-s-4)k}\right)}{4}\right),$$

and the null hypothesis $\Delta\ln\bar{P}_{k(t)}=0$ is tested as

$$\ln\left(exp\left(\tilde{\beta}_t + \tilde{\theta}_{tk}\right) + exp\left(\tilde{\beta}_{t-1} + \tilde{\theta}_{(t-1)k}\right) + exp\left(\tilde{\beta}_{t-2} + \tilde{\theta}_{(t-2)k}\right) + exp\left(\tilde{\beta}_{t-3} + \tilde{\theta}_{(t-3)k}\right)\right) -$$
$$\ln\left(exp\left(\tilde{\beta}_{t-s} + \tilde{\theta}_{(t-s)k}\right) + exp\left(\tilde{\beta}_{t-s-1} + \tilde{\theta}_{(t-s-1)k}\right) + exp\left(\tilde{\beta}_{t-s-2} + \tilde{\theta}_{(t-s-2)k}\right) + exp\left(\tilde{\beta}_{t-s-3} + \tilde{\theta}_{(t-s-3)k}\right)\right) = 0.$$

Similarly, the statistical significance of the percentage change in the price index of property type *m* at quarter *t* from *t-s* (i.e. the null hypothesis $\Delta\ln\bar{P}_{m(t)}=0$) is tested as,

$$\ln\left(exp\left(\check{\beta}_t + \check{\rho}_{tm}\right) + exp\left(\check{\beta}_{t-1} + \check{\rho}_{t-1m}\right) + exp\left(\check{\beta}_{t-2} + \check{\rho}_{t-2m}\right) + exp\left(\check{\beta}_{t-3} + \check{\rho}_{t-3m}\right)\right) -$$

$$-\ln\left(exp\left(\check{\beta}_{t-s} + \check{\rho}_{(t-s)m}\right) + exp\left(\check{\beta}_{t-s-1} + \check{\rho}_{(t-s-1)m}\right) + exp\left(\check{\beta}_{t-s-2} + \check{\rho}_{(t-s-2)k}\right)\right.$$
$$\left. + exp\left(\check{\beta}_{t-s-3} + \check{\rho}_{(t-s-3)k}\right)\right) = 0,$$

and the statistical significance of the percentage change in the aggregate property price index (i.e. the null hypothesis $\Delta\ln\bar{P}_{G(t)}=0$) as

$$\ln\left(exp\left(\hat{\beta}_t\right) + exp\left(\hat{\beta}_{t-1}\right) + exp\left(\hat{\beta}_{t-2}\right) + exp\left(\hat{\beta}_{t-3}\right)\right) -$$

$$- \ln\left(exp\left(\hat{\beta}_{t-s}\right) + exp\left(\hat{\beta}_{t-s-1}\right) + exp\left(\hat{\beta}_{t-s-2}\right) + exp\left(\hat{\beta}_{t-s-3}\right)\right) = 0$$

The size of the resulting statistic obtained from the application of the above test indicates the reliability of the estimated price change. This is illustrated in the discussion of the estimated changes in the price of properties in different districts and for different types results presented in the next section.

IV. DETERMINANTS OF PROPERTY PRICES

In this section we describe the methodology used in order to examine how property prices are affected by their characteristics and macroeconomic variables. Essentially, the proposed methodology is an extension of the one used for the estimation of property indices in the previous section; and is equally applicable to residential and plot/land properties, although here is illustrated using data only for residential properties. In addition, regime-switching methodology is implemented to identify cycles in the property market.

IV.1 Literature review

There is a vast literature examining both the factors affecting behaviour in the real estate market and the influence of microeconomic and macroeconomic variables on property prices. Certainly, characteristics such as the type, size and regional location have a critical effect on price at the individual property level. Although these characteristics change over time and their effect needs to be accounted for in empirical investigation, the main changes of property prices over time are largely determined at the macroeconomic level by factors affecting property demand and supply, such as the interest rate, GDP and population growth, unemployment, inflation, construction costs etc.

The literature related to property prices can be separated in two main lines of research:

i. The microeconomic analysis mainly applied to houses and uses: (a) the hedonic approach that considers the relationship between the price and the quality characteristics of houses (size, type, location, etc.); and (b) the relationship between consumption patterns and house prices for different types of households.

ii. The macroeconomic analysis that is mostly concerned with factors influencing property prices over time at an economy-wide level such as per

capita GDP, interest rate on loans, unemployment inflation, returns in the stock exchange etc.

The hedonic approach is based on the consumer theory (Griliches, 1961 and 1964; Lancaster, 1966) and was formalised first by Rosen (1974). There are numerous econometric applications of hedonic analysis exploring the contribution of product characteristics to the determination of its price for a wide range of goods and services. In the case of houses, this analysis examines how and to what extent house prices are determined by broadly defined quality characteristics, such the type of building (e.g. flat, detached, semi-detached, terraced), size and number of rooms, regions, the presence of facilities and many neighbourhood characteristics. Most of the latest studies show that the size of the residence (Carroll, Clauretie and Jensen, 1996; Rodriguez and Sirmans, 1994) and the number of rooms (i.e. Fletcher, et al., 2000; Adair et al., 2000) affect positively the price of houses. Attanasio and Weber (1994), and Attanasio et al. (2009), using individual household level data for the UK, investigate the relationship between consumption patterns and house prices for different types of households; while Ratcliffe (2010) examine (separately for homeowners and non-homeowners in the UK) whether house prices influence well-being, and whether this effect runs via wealth or other factors, such as economic conditions.

The literature on the macroeconomic determinants of property prices is also vast. For many years, researchers use applied regression analyses to evaluate how growth in property (mostly house) prices is being driven by economic factors including interest rates, inflation, unemployment rate and economic growth. The majority of these papers identify as the most important explanatory variables:

(i) interest rates (Muellbauer and Murphy, 1997; Maclennan et al., 1998; Abraham and Hendershott ,1992; Iacoviello and Minetti,2003; Himmelberg et al.,2005; Adams and Füss, 2010; McQuinn and O'Reilly,2008; and Bouchouicha and Ftiti, 2012), and

(ii) GDP or GDP per capita (Giussani et al.,1992; Englund and Ioannides, 1997; Ferrara and Koopman, 2010) .

Other papers find money shocks (Lastrapes, 2002), inflation (Brunnermeier and Julliard; 2008), unemployment and money supply (Clapp and Giaccotto, 1994; Adams and Füss,2010), conditions in the labour market (Sternlieb and Hughes, 1997) and employment characteristics (Hartzell et al. ,1993) to influence demand for housing and, consequently, house prices. In addition, regime-switching methodology implemented by Hall et al. (1997) and Nneji et all (2013) identifies cycles in the property market and can be used to study government's ability to affect a regime shift. Tsatsaronis and Zhu (2004) analyse the main forces that drive aggregate house prices across a number of industrialised countries.

The conclusion emerging from the literature is the dominance of interest rates and GDP per capita on house prices. It remains to be seen whether this is also true for Cyprus.

IV.2 Empirical analysis

The choice of the variables for the investigation of their effect on property prices is guided by the international literature and a list is given below.

Property characteristics

Residential

- Type of unit (detached or semi-detached house, flat)
- Size of unit
- Number of rooms
- District

Land

- Type of unit (plots, agricultural land and settleable land)
- Size of unit
- District

Domestic variables[15]

- Aggregate income (GDP)
- Unemployment, employment
- Population (and population in different age brackets)
- Net migration
- Interest rate (house purchase loans)
- Credit supply
- Stock of outstanding loans
- Wealth (approximated by e.g. deposits)
- Inflation
- Stock market index (alternative investment to property)
- Economic sentiment indicators (firms and consumer expectations)
- Gross fixed capital formation (investment) in housing and other type of construction
- Index of production in construction (or gross value added of construction)
- Local sales of cement
- Building permits
- Index of output prices in construction
- Price index of construction materials
- Labour cost in construction

[15] The effects of fiscal policies (e.g. introduction of VAT, rises in property taxes) could also be investigated.

- Expectations of firms in construction about activity, prices and employment

Foreign variables

- Aggregate income in the United Kingdom, Russia, etc.
- Unemployment in the United Kingdom, Russia, etc.
- Exchange rates (e.g. sterling to euro, rouble to euro)
- International stock market indicators
- Property price indices
- Economic sentiment indicators.

IV.2.1 Analysis of pooled data

The analysis of the determinants of property prices here is first carried out using equation (3.1), augmented to include not only the property characteristics but also macroeconomic variables that are found in the literature to affect property prices. Thus, the (log) price of property unit i in quarter t is assumed to be determined by

$$\ln p_{i(t)} = \alpha_0 + \alpha_1 \ln A_{i(t)} + \sum_{s=2}^{4} \beta_s Q_{s(t)} + \sum_{k=1}^{K-1} \gamma_k D_{i(t)}^{k} + \sum_{m=1}^{M-1} \delta_m U_{i(t)}^{m}$$

$$+ \sum_{m=1}^{M-1} \varphi_m U_{i(t)}^{m} \ln A_{i(t)} + \sum_{l=1}^{L} \phi_l M_{(t)}^{l} + \sum_{h=1}^{H} \xi_h \ln p_{i(t-h)} + v_{i(t)} \qquad (4.1)$$

where $Q_{s(t)}$ denotes quarterly dummy variables; $M_{(t)}^{l}$ macroeconomic variables and ϕ_l their effect on prices; and ξ_h the effect of the dependent variable lagged h periods. The rest of the variables and parameters in (4.1) are as defined in (3.1). Note that the parameters of continued variables in (4.1) are elasticities (i.e. show the percentage change in the dependent variable associated with a percentage change in the independent variables).

Table 1 reports preliminary results obtained from OLS estimation of (4.1). In the columns under the heading “Model 1" and “Model 2” the estimated elasticities corresponding to variables often used in the literature as macroeconomic determinants of house prices are reported; while in the column under the heading “Model 3” these elasticities are allowed to differ before and after the onset of financial crises in 2009. All models include the property characteristics (type and district) as conditioning variables.

Table IV.1: Macro and micro elasticities of house prices
(Robust standard errors in parentheses)

	Model 1 (Period 2004-2014)	Model 2 (Period 2000-2014)	Model 3 (Period 2000-2014)
Macro variables			
GDP per capita_CY	0.424*	0.521**	0.921
	(0.232)	(0.237)	(0.726)
First lag of house prices	0.818***	1.031***	1.066***
	(0.063)	(0.053)	(0.064)
Fourth lag of house prices	-0.095**	-0.174***	-0.192***
	(0.046)	(0.044)	(0.069)
Inflation rate	-0.018	0.012	-0.136
	(0.278)	(0.279)	(0.504)
Interest rate for purchase	-0.010	-0.011	0.001
	(0.008)	(0.008)	(0.015)
Stock Price Index	-0.004	0.053***	0.075**
	(0.019)	(0.018)	(0.032)
Price index of construction materials	0.316***	0.311***	0.164
	(0.116)	(0.114)	(0.351)
Number of registered unemployed	-0.038	-0.002	0.004
	(0.030)	(0.030)	(0.058)
Interactions (if year>2008)			
GDP per capita_CY			0.316
			(0.920)
First lag of house prices			-0.883***
			(0.206)
Fourth lag of house prices			0.395**
			(0.182)
Inflation rate			0.181
			(0.641)
Interest rate for purchase			-0.010
			(0.018)
Change of stock price index			-0.098**
			(0.041)
Price index of construction materials			-1.483**
			(0.633)
Number of registered unemployed			0.031
			(0.083)
Year>2008			9.740***
			(2.726)
Micro Variables			
Type (Ref: Flat)			
House	0.074***	0.135***	0.135***
	(0.007)	(0.007)	(0.007)
District (Ref: Nicosia)			
Larnaca	-0.127***	-0.171***	-0.171***
	(0.010)	(0.010)	(0.010)
Limassol	0.091***	0.044***	0.044***
	(0.009)	(0.010)	(0.010)
Famagusta	0.011	0.000	0.000
	(0.013)	(0.013)	(0.013)
Paphos	-0.064***	-0.040***	-0.040***
	(0.013)	(0.013)	(0.013)
Constant	0.279	-1.209**	-1.442*
	(0.507)	(0.480)	(0.815)

Observations	6,239	7,936	7,936
R-squared	0.266	0.581	0.582

Notes: *** p<0.01, ** p<0.05, * p<0.1

It should be noted here that in addition to the variables reported in Table 4.1, we have also investigated the effects of population, lending rates, deposits, and deposits of non-residents, loans/mortgages, number of foreign workers, number of tourism arrivals, output prices index in construction, local cement sales, index of production in construction, expectations, government debt as percentage of GDP, Cyprus ratings and/or international assessments in order to capture uncertainty, and other foreign variables such as GDP for UK and Russia and exchange rates. For different time periods we have also investigated the effects of the last two quarters, last year, last two years etc. We have also allowed the effects of the fore-mentioned variables to vary between years/periods[16] (e.g. recession, EU accession, euro membership) and between districts or types of property.

The main conclusion emerging from the empirical analysis is that with the exception of the lagged values of the dependent variable, the GDP per capita and the price index of construction materials, the estimated effects are not robust to changes in the variables included in the regression and the time period over which these effects are estimated. This sensitivity of the results to changes in the specification can be attributed to:

(i) the turbulent economic environment during the period under investigation,

(ii) interdependence (e.g. GDP per capita and unemployment) and/or common trends in the data (e.g. cost of building materials and inflation), and

(iii) the property market in Cyprus often being dominated by short-term speculative rather than long-term investment behaviour.

[16] The differentiation has been performed (i) by estimating individual models for different time periods (2000-2004, 2005-2008 and 2009-2014) and (ii) by capturing different time periods using a structural break variable (a binary variable) with the latter also interact with all independent variables.

IV.2.2 Time series analysis

In order to circumvent the above problems we estimate (4.1) in first differences using time series (quarterly) data obtained from averaging the property type and district house price indices. This should help avoid multicollinearity due to interdependence and/or common trends in the data; and is justified by the fact that the parameter of the one-period dependent lag is around unity (Table 4.1). Furthermore, to model excessive turbulence in the property market during the period under investigation, we include endogenously determined variables capturing structural breaks in property price behaviour.

More specifically, the model estimated using time series data has the form

$$\Delta \ln p_{i(t)} = \alpha_0 + \sum_{l=1}^{L} \phi_l \, \Delta M_{(t)}^{l} + \sum_{h=1}^{H} \xi_h \, \Delta \ln p_{i(t-h)} + \sum_{g=1}^{G} \zeta_g \, S_{(t)}^{g} + v_{i(t)}, \qquad (4.2)$$

where the Δ is the first difference operator and $S_{(t)}^{g}$ is the g^{th} endogenously determined structural break in period t. The rest of the variables in (4.2) are as defined in (4.1); however, the parameters ϕ_l here are interpreted as growth elasticities, i.e. show the change in the growth rate of property prices associated with a change in the growth rate of the corresponding independent variable.

Table 2 reports the results obtained from first assuming no structural breaks ($S_{(t)}^{g} = 0, all\ g = 1, \dots, G$) in the data. It appears that some growth elasticities are significant: GDP per capita, lending rate, inflation and local cement sales. Nevertheless, when foreign variables (i.e. GDP per capita in the UK and Russia or exchange rates) are also included in the regression the effects become diluted and mostly negligible. Once again, no statistically significant differences between years/periods are found.

Table IV.2- Time series estimates of growth elasticities of house prices
(Robust standard errors in parentheses)

	Model 1	Model 2	Model 3
GDP per capita_CY (lag2)	0.470*	0.611**	0.569
	(0.270)	(0.302)	(0.343)
First lag of House Price Index	0.919***	0.915***	0.883***
	(0.081)	(0.079)	(0.084)
Fourth lag of House Price Index	-0.198***	-0.217***	-0.191**
	(0.067)	(0.072)	(0.072)
Interest rate for purchase (lag2)	-0.012*	-0.015**	-0.013*
	(0.007)	(0.007)	(0.007)
Inflation rate (lag1)	0.348*	0.416**	0.343
	(0.198)	(0.202)	(0.214)
Stock Price Index (lag 2)	0.003	0.004	-0.003
	(0.010)	(0.011)	(0.013)
Local cement sales (lag2)	0.045**	0.056***	0.049**
	(0.019)	(0.020)	(0.022)
Unemployment rate (lag1)	0.005	0.009*	0.008
	(0.004)	(0.005)	(0.005)
Russian rouble (lag1)		0.111**	0.110**
		(0.049)	(0.047)
UK Pound sterling (lag4)		0.092	0.108
		(0.062)	(0.070)
GDP per capita_Russia			0.256
			(0.340)
GDP per capita_UK			0.018
			(0.529)
Constant	0.002	-0.001	-0.003
	(0.004)	(0.004)	(0.004)
Observations	52	52	52
R-squared	0.820	0.845	0.849

Notes: *** p<0.01, ** p<0.05, * p<0.1

Next, we move a step further using a Markov Switching (MS) model due to Hamilton (1889, 1994)[17] to examine the relationship between the growth rate of property prices associated with the growth rate of macroeconomic variables in the presence of structural breaks. More precisely the variable $S_{(t)}^{g}, all\ g = 1, \dots, G$ in equation (4.2) are allowed to be endogenously determined. At this early stage in our investigation we use a two-regime (boom and bust) MS model (i.e. $S_{(t)}^{g}, g = 1,2$) and the variables included in the empirical specification are the[18]:

[17] A simple description of the MS methodology used here is provided by Savva (2015).

[18] Note that the explanatory variables are lagged and not contemporaneous to avoid the possible concern that there may potentially be an endogeneity problem if there are feedbacks from the housing market to the macroeconomy; or if house price dynamics affect monetary policy.

- percentage change in consumption (ΔlnC),
- change in lending rate (ΔLR),
- percentage change in stock returns (ΔlnSR),
- percentage change in exchange rates (ΔlnXR),
- change in unemployment rate (ΔUR),
- change in inflation rate (ΔIR), and
- one quarter lag of the dependent variable.

Prior to discussing the regime-dependent estimates, it is important to refer to the estimated smoothed probabilities of the property prices being in any of the two (boom and bust) growth regimes. These probabilities are dependent on the estimated transition probability matrix, (the probability of switching from one regime to another at time *t*) given by

$$P = \begin{bmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{bmatrix} = \begin{bmatrix} 0.941 & 0.066 \\ 0.059 & 0.934 \end{bmatrix}$$

where 1=boom and 2=bust regime. The probability of remaining in the boom regime in a period *t,* given that the growth in property prices was in the boom regime in the period *t*-1, is 94% (i.e. there is a 6% chance of switching from the boom regime to the bust regime). The bust regime has the least persistence in that there is a 93.5% probability of remaining in the bust period if there was a recession the previous quarter.

The transition probabilities above are used to compute the expected duration of being in each of the regimes using the formula $ED = 1/(1 - p_{it})$. Our estimates suggest that the ED of being in the boom and bust regimes is roughly 17 and 15 quarters, respectively. Thus, we would expect the recession period in property market to last for four years and a property boom to last for just over four years. A graphical representation of the smoothed probabilities is given in Figure 4.1, where we note that the dominant state for the period under investigation is the boom; this is switched to recession after 2009. Various incidents such as the worldwide financial crises, but more importantly the unprecedented measures agreed with the European Stability Mechanism (ESM) and the International Monetary Fund (IMF) in April 2013 to save the country from its severe financial conditions, are probably responsible for this situation.

Figure 1: House price dynamics and regimes

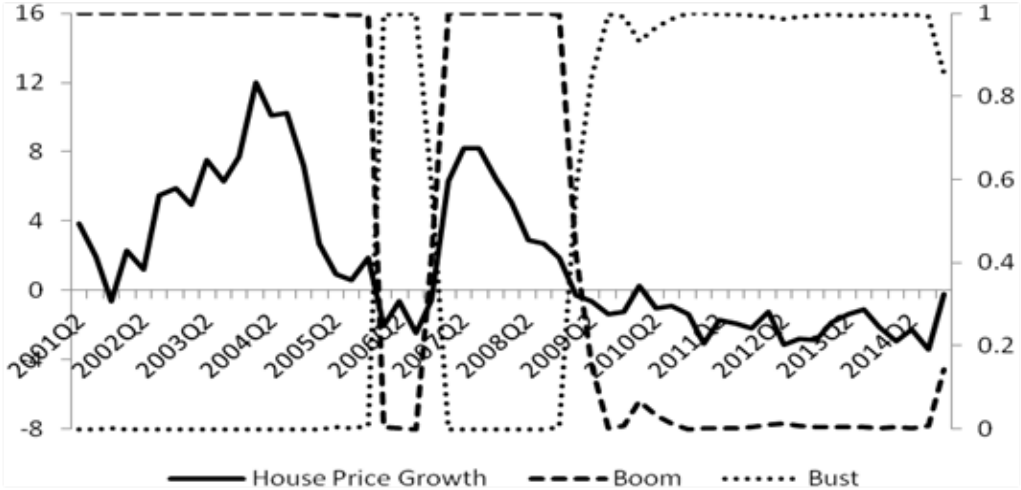


Table 3 provides the estimated parameters (growth elasticities) of the MS model which aims at providing a detailed insight into how changes in macroeconomic variables influence the growth in property prices in the two regimes. As it can be seen from the figures reported in Table 3, there are clear differences mainly in the significances and sizes, but also in the signs, of the estimated growth elasticities depending on the regime. In particular, it appears that changes in the macroeconomic variables influence the property market in the boom regime only.

Table IV.3: Growth elasticities estimated using Markov-Switching methodology (standard errors in brackets)

	Intercept	ΔLR	ΔlnC	ΔUR	ΔlnSR	ΔlnXR	ΔIR	σ
Boom	1.709***	-0.569***	2.590***	-0.309***	-0.286***	0.041**	0.177***	2.896***
	(0.693)	(0.101)	(0.941)	(0.096)	(0.091)	(0.022)	(0.072)	(0.782)
Bust	-1.501***	-0.134	0.193	-0.066	0.215	0.012	-0.068	0.753***
	(0.365)	(0.205)	(0.729)	(0.134)	(0.176)	(0.011)	(0.053)	(0.214)
E(Duration regime 1): 16.816								
E(Duration regime 2): 15.123								
Adj R^2: 0.825								

Notes: *, ** and *** denote significance at 10%, 5% and 1% respectively.

Commenting on the effects of each macroeconomic variable used in the analysis one can say that:

- an increase in the lending rate is expected to cause a fall in the growth rate of house prices, perhaps as a result of investors' expectations of future increases in the cost of borrowing;

- in the crash regime, the lending rate has no effect in house price dynamics, probably because of the very low investor expectations;
- disposable income growth augments house price growth in the boom regime more, in terms of both size and significance, in the MS than in the non-MS model;
- in high regime (unlike the non-MS model) an increase in the unemployment rate has an adverse and significant effect on house prices;
- stock returns cause a decrease in property prices growth, possibly, because investors find it more profitable to invest in stock market;
- in contrast to the non-MS model, which suggest that the rate of inflation is statistically insignificant, we find that inflation does in fact have a positive effect on the growth of house prices in the boom regime; and
- the uncertainty prevailing in the residential property market (as measured by the parameter σ) appears to be almost four times higher during the boom compared to the bust regime.

IV.3 Conclusions and further investigation

In this section we have described the methodology used in order to examine how property prices are affected by their characteristics and macroeconomic variables. The choice of macroeconomic variables for inclusion in the empirical investigation is guided by the international literature and include: (i) domestic variables, such as GDP, unemployment, population, interest rate, inflation, stock market index, price index of construction costs, expectations etc.; and (ii) foreign variables such as the UK and Russian GDP and unemployment, exchange rate, international stock market indicators etc.

The analysis of the determinants of property prices is first carried out using property characteristics and macroeconomic variables in levels (rather than in growth rates). The conclusions emerging from this analysis is that: (i) few variables (i.e. lagged values of the dependent variable, the GDP per capita and the price index of construction materials) appear to have a significant effect on house prices; and (ii) the estimates are not robust to changes in the variables included in the regression and the time period over which these effects are estimated.

In order to circumvent the above problems we estimate the model in first differences using time series (quarterly) data obtained from averaging the property type and district property price indices. Endogenous variables capturing

structural breaks in property price behaviour are also included in the empirical specification. In this case some growth elasticities are significant: GDP per capita, lending rate, inflation and local cement sales. However, when foreign variables (i.e. GDP per capita for UK and Russia or exchange rates) are also included in the regression the effects become diluted and mostly negligible.

Next, a Markov Switching model is used to allow for structural breaks in the relationship between the growth rate of property prices and the growth rate of macroeconomic variables. We find that there are clear differences in the significances and sizes – but, also, in the signs - of the estimated growth elasticities depending on whether the property market is in the boom or bust regime. In particular, it appears that changes in the macroeconomic variables influence the property market in the boom regime only.

In conclusion, finding reliable determinants of house prices in Cyprus over the period 2000-2014 appears to be undermined by the turbulence of the economic environment and, possibly, the fact that the property market in Cyprus was dominated by short-term speculative behaviour over this period. Nonetheless, our plan is to continue to strive for more reliable level and growth elasticity estimates employing:

(i) more information, by including plot and land prices in the empirical analysis, which will provide another dimension in property price behaviour and double the number of observations in the sample; and

(ii) more advanced econometric techniques and model specification, by using dynamic panel data estimators that will improve the efficiency of estimates by drawing on information not only at the aggregate level but also at the property type and at district level.

V. FORECASTING PROPERTY PRICES

As discussed in the previous chapter a number of macroeconomic indicators are likely to affect the evolution of property prices. These indicators can jointly provide useful information for future movements in property prices, although their individual effect on property prices may not be possible to be determined separately. Also, while changes in the price of individual property types are difficult to predict, changes in aggregate property prices can be forecasted.

Different linear and non-linear univariate or multivariate models have been employed in the literature for forecasting property price indices (e.g. Auterson 2014; Case and Shiller 1990; Crawford and Fratantoni 2003, Guirguis et al. 2005; Miles 2007). As the real estate market is characterised by cycles (booms

and busts) there is empirical evidence in favour of regime switching models, and, in general, models with varying coefficients that capture the different states of the particular market (e.g. Corradin and Fontana 2013; Guirguis et al. 2005; Nneji et al. 2013). Although the in-sample fit of models with time/state-varying parameters is found to be superior to that of simpler models and therefore providing useful insights into the drivers of the real estate market, the out-of-sample forecasting performance of the former is rather poor (e.g. Bessec and Boubdallah 2005; Crawford and Fratantoni 2003).

The techniques that have been used in the literature for forecasting property prices are either univariate (i.e. involve only the series to be forecasted) or use only a limited number of predictors (e.g. Guirguis et al. 2005; Miles 2007). However, rapid developments in information technology allow researchers and practitioners to easily access numerous economic and financial time series data that can be utilised for economic analysis and forecasting. Thus, the availability of a large number of potentially useful predictors can be exploited via the estimation of a large set of linear dynamic forecasting models for the property price index and the application of techniques that combine the forecasts from the different models into a single forecast. The construction of forecasts via forecast combination methods has been applied widely in the literature; areas of applications include output growth (Stock and Watson 2004), inflation (Stock and Watson 2008), exchange rates (Wright 2008), and stock returns (Avramov 2002). Furthermore, forecast combinations can deal with model instability and structural breaks (e.g. Hendry and Clements 2004; Stock and Watson 2004), which are features often encountered in modelling the evolution of property indices.

V.1 Forecast method

The forecasting method used in this paper exploits the information from a large number of possible predictors. The dataset contains variables that represent many aspects of the economy including domestic and foreign output; labour market; domestic and international price indices and international commodity prices; exchange rates; domestic and foreign interest rates, stock market indicators and economic sentiment indicators; fiscal data and banking sector series.

Time series models that are traditionally used for forecasting (single equations or systems) can only handle a small number of variables. This limitation of traditional time series models here is tackled with the application of forecast combination methods. Forecast combination methods combine information across forecasts computed from different models. There is a large and growing

literature which suggests that forecast combinations can provide more accurate forecasts by using evidence from all the models considered rather than relying on a specific model (e.g. Angelini et al. 2011; Drechsel and Scheufele 2013; Hahn and Skudelny 2008; Stock and Watson 2004). One justification for using forecast combination methods is the fact that in many cases we view models as approximations because of the model uncertainty that forecasters face due to the different set of predictors, the various lag structures and, generally, the different modelling approaches. Forecast combinations can also deal with model instability and structural breaks under certain conditions.

The following single equation dynamic models for the percentage changes of aggregate property price indices are estimated:

- univariate models such as the autoregressive (AR), moving average (MA) and autoregressive moving average (ARMA) models; and
- bivariate models of the form of autoregressive distributed lag (ADL) models, which include lags of alternative macroeconomic indicators in addition to the lagged values of the dependent variable.

The extensive dataset employed contains a large number of candidate predictors that are published on a monthly basis. According to the schedule for the production of the property price indices, data for a given reference quarter will be made available about 2 weeks after the end of the quarter. This schedule is similar to that for the release of many leading indicators (e.g. consumer price indices, registered unemployed, price index of construction materials); a number of financial series (e.g. stock market indices, exchange rates, European interest rates) as well as business and consumer survey data are published right after the end of the reference quarter and therefore before the release of the property price indices. Moreover, data availability for property price indices, for a given reference quarter, will precede national accounts and employment data, for the same reference quarter, by one quarter.

The latest available data for the property price indices at the time when the forecasts are constructed cover quarter t. Given the release schedule of the different variables in the dataset, the predictors (x in equation 5.1) can be grouped in four categories according to the available information relative to quarter t:

(a) predictors with available observations up to the end of quarter t (e.g. consumer price indices, registered unemployed, price index of construction materials, stock market indices, exchange rates, European interest rates, business and consumer survey data);

(b) predictors with available observations up to the second month of quarter t (e.g. domestic interest rates, loans, deposits);

(c) predictors with available observations up to the first month of quarter t (e.g. building permits, industrial turnover index, turnover index of retail trade);

(d) predictors with available observations up to quarter $t-1$ (e.g. national accounts data, employment).

The variable to be forecasted is defined as $p_t = \ln P_t - \ln P_{t-1}$ where P_t is the level of property price index in quarter t. The candidate predictors are denoted by x_t (appropriately transformed to achieve stationarity). In the forecasting models the variable of interest is expressed at annual rate and as a function of the forecasting horizon, h. Specifically, $p_{t+h}^h = (400/h)(\ln P_{t+h} - \ln P_t)$, for $h = 1, 2, ...$, which denotes the annualised percentage change of the index over the next h quarters. The h-step ahead regression model used for computing the forecasts for $h = 1, 2, ...$ is given by

$$p_{t+h}^h = \alpha + \sum_{i=1}^{p} \beta_i x_{t-i} + \beta_0 x_t + \sum_{i=0}^{q} \gamma_i p_{t-i} + e_{t+h}^h \qquad (5.1)$$

where x_t denotes one of the following:

(i) the quarterly value of variable x in quarter t,

(ii) a vector of the monthly values of variable x corresponding to the first and second month of quarter t i.e. $\beta_0 x_t = \beta_{01} x_t^{M1} + \beta_{02} x_t^{M2}$,

(iii) the monthly value of variable x corresponding to the first month of quarter t, i.e. $\beta_0 x_t = \beta_{01} x_t^{M1}$,

and $\beta_0 = 0$ if observations for predictor (x) are available up to quarter $t-1$ (i.e. x belongs to group (d) described above). The quarterly lags of predictor x are denoted by x_{t-i} and the error term is given by e_{t+h}^h. For $\beta_i = 0$ ($i = 0, 1, \dots, p$) equation (5.1) gives the AR model of order q.

The estimation of the parameters and the selection of the number of lags (p, q) in (5.1) is carried out in a pseudo out-of-sample setup using recursive OLS and recursive determination of the lag length based on the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC); both criteria penalise models for each additional lag (e.g. Stock and Watson 2003). BIC penalises models with additional lags more than the AIC and as a result the latter can overestimate the lag length. In the analysis that follows both criteria are used and the resulting models, (usually, each with a different lag structure) are treated as

two alternatives. The choice of the number of lags for predictor x_t is between one and two and for the dependent variable p_t between zero and two.[19]

The forecast constructed at date t for period $t+h$ is computed using data up to date t, thus no additional projections for predictors are required; this type of forecast is known as 'direct' forecast (see e.g. Stock and Watson 2004, 2008). The computation of 'direct' forecasts, as opposed to iterated, is more pertinent to our case. The use of an extensive dataset would require forecasts for all the predictors if the 'iterated' forecasts were to be computed. Many of the predictors are quite difficult to forecast thus by computing 'direct' forecasts we avoid introducing unreliable forecasts for regressors in the construction of the forecast of interest.

The models are estimated using the first T_0 observations of the sample and the first pseudo out-of-sample forecast is computed in period $t = T_0 + h$. The recursive procedure requires increasing the sample size by one observation, re-estimating the models and computing the forecast in period $t = T_0 + h + 1$. The procedure is repeated up to the end of the sample period, T, so that the pseudo out-of-sample forecast computed in period $t = T - h$, for horizon h, refers to period T, which is the last date for which observed data exist. The h-quarter ahead forecast for p_{t+h}^h computed in period t is given by $\hat{p}_{t+h|t}^h$. Then, the Mean Squared Forecast Error (MSFE) used for evaluating the forecasting performance of each model and combination method at horizon h is given by

$$MSFE = \frac{1}{(T_N - h) - (T_0 + h)} \sum_{t=T_0}^{T-h} (p_{t+h}^h - \hat{p}_{t+h|t}^h)^2 \qquad (5.2)$$

where T_N here denotes the number of observations in the sample.

The estimated models yield a large number of alternative forecasts for the percentage changes of the property price indices computed over a forecast horizon of h quarters. Subsequently, the model forecasts are combined using different combination methods. Although there is a consensus that forecast combinations improve forecast accuracy, the same is not true for how the forecast weights should be formed. Given *M* models and associated forecasts, combination forecasts are weighted averages of individual forecasts, where the weights can be fixed or time-varying. More specifically the combination forecast is given by

[19] Due to the small sample size there is a trade-off between the maximum lag length and the number of degrees of freedom, thus the former is limited to two lags beyond the presence of x_t (quarterly or monthly values); with the addition of more observations the maximum number of lags can be increased.

$$\hat{F}^h_{t+h|t} = \sum_{i=1}^{M} w_{i,t}\, \hat{p}^h_{i,t+h|t} \quad (5.3)$$

where $\hat{p}^h_{i,t+h|t}$ is the $h-$step ahead forecast from model i made at time t and $w_{i,t}$ is the weight assigned to that forecast. This weight depends on the historical forecasting performance of model i; however, $w_{i,t}$ can be fixed leading to simple forecast combinations such as the mean ($w_{i,t} = 1/M$), the median or some type of a trimmed mean. When $w_{i,t}$ depends on model's past forecasting performance the resulting combination forecasts are known as discounted MSFE forecasts (Stock and Watson 2004). In particular, the weights can be inversely proportional to the discounted MSFE (or its square) of the individual models, i.e.

$$w_{i,t} = \frac{v_{i,t}}{\sum_{j=1}^{M} v_{j,t}} \quad (5.4)$$

or

$$w_{i,t} = \frac{(v_{i,t})^2}{\sum_{j=1}^{M} (v_{j,t})^2} \quad (5.5)$$

where $v_{i,t} = \left[\sum_{s=T_0}^{t-h} \delta^{t-h-s} (p^h_{t+h} - \hat{p}^h_{i,t+h|t})^2\right]^{-1}$;

δ is the discount factor, so that forecast errors made in the distant past are of smaller importance. Thus, larger weights are assigned to forecasts from models with lower MSFE (i.e. better historical forecasting performance).

The forecasting performance of the different forecast combination methods is evaluated by computing the MSFE given in equation (5.2) for the combination forecasts $\hat{F}^h_{t+h|t}$. The comparison of the MSFE from the different models and forecast combination methods reveals the combination method and group of predictors (economic indicators) that have been generating the most accurate forecasts historically.

V.2 Forecasting performance

The dataset used in the estimation and forecasting exercise covers the period

(a) 2000Q4-2014Q4 in the case of the residential price index, and

(b) 2005Q4-2014Q4 in the case of the land/plot price index.

In addition to the overall residential and land/plot price index, the dataset contains about 260 variables that represent many aspects of the economy including domestic and foreign output (national accounts and monthly indicators such as volume indices of sectors of the economy, tourist arrivals, cement sales, building permits, etc.); labour market (employment, unemployment, vacancies);

domestic and international price indices and international commodity prices; exchange rates; domestic and foreign interest rates, stock market indicators and economic sentiment indicators; fiscal data (government expenditure, revenue and deficit) and banking sector series (loans, deposits). A detailed list of the variables used is provided in Appendix B. Depending on the release schedule of each series relative to that of the property price indices, the available data on some variables which are published with a delay end in 2014Q3 (e.g. national accounts, employment).

V.2.1 Residential property price index

The variable to be forecasted, namely $p_{t+h}^{h} = (400/h)(\ln P_{t+h} - \ln P_t)$ is plotted in Figure V.1 for $h = 1$ and $h = 4$ representing the percentage change of the residential property price index with respect to the previous quarter (expressed as an annualized rate of change) and the same quarter of the previous year respectively[20]. The two peaks in the series registered in 2004 and 2007 are modelled with dummy variables present in all forecasting equations considered. After 2008 the percentage changes of the residential price index become negative but less volatile compared to the pre-2009 period, marking a period of price declines in the house market.

[20] The smoothed aggregate residential property index is used.

Figure V.1: Percentage change of residential property price index

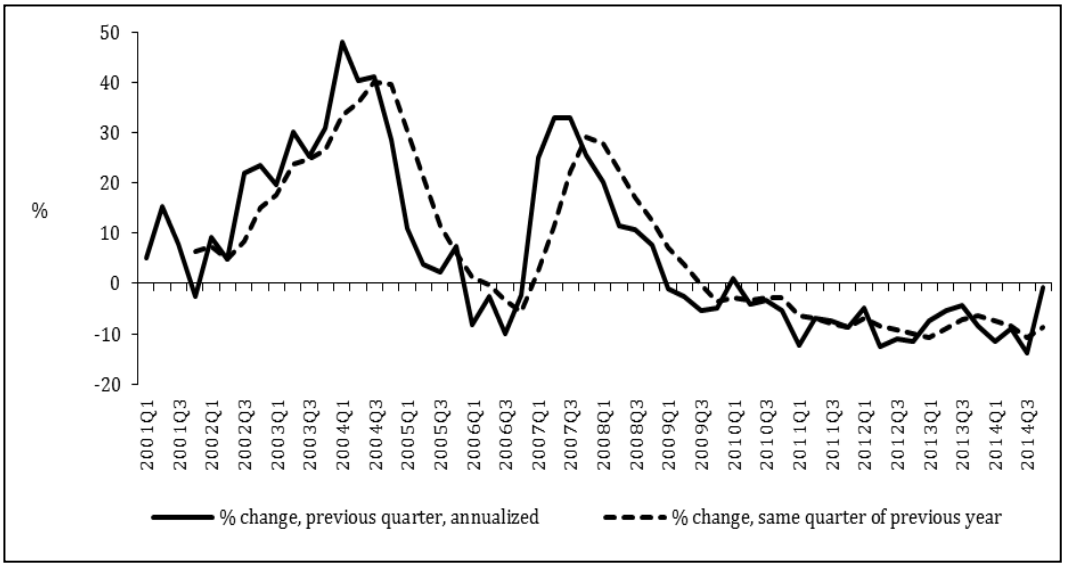


Table V.1 reports the results of the forecasting exercise for the residential property price index; the exercise covers univariate models and various forecast combinations from ADL models which include one predictor at a time.[21] In particular, the table shows the square root of MSFE (RMSFE) of each model or combination method relative to the RMSFE of the simple autoregressive model of order 1 (AR(1)). The RMSFE of AR(1), i.e. the benchmark model, is shown in the first panel of Table V.1.

The second panel of Table V.1 reports the results of the forecasting performance of some univariate models relative to that of AR(1). The simple AR(1) performs at least as well as the other univariate models considered for a horizon of up to three quarters ahead and for longer horizons between six and eight quarters. For a horizon of four and five quarters the autoregressive moving average model of order 1 (ARMA(1,1)) outperforms the AR(1) model exhibiting the highest forecast gains in terms of reduced RMSFE relative to the other models.

The third and fourth panel of Table V.1 show the relative performance of various forecast combination methods constructed from forecasts resulting from (i) all predictors in the dataset and (ii) a subset of variables closely related to the real estate market respectively. This subset consists of variables found in the

[21] The period for which the pseudo out of sample forecasts are constructed varies with the forecast horizon. In particular, the periods are: 2008Q1-2014Q4 (h=1), 2008Q4-2014Q4 (h=2), 2009Q3-2014Q4 (h=3), 2010Q2-2014Q4 (h=4), 2011Q1-2014Q4 (h=5), 2011Q4-2014Q4 (h=6), 2012Q3-2014Q4 (h=7), 2013Q2-2014Q4 (h=8).

literature to affect property prices (e.g. income, interest rates, inflation, credit, stock market indices, etc.), or, are associated with the domestic construction and real estate sectors (e.g. sales of cement, building permits, price index of construction materials, indicators of foreign demand and of international economic environment, etc.). The subgroup of predictors is further divided into domestic and foreign/international series reflecting domestic property supply/demand factors and foreign demand drivers respectively (see Appendix B for details).

We consider the following forecast combination methods:

(a) simple methods namely the median, mean and trimmed mean, i.e. the mean after discarding the highest and lowest 5% of the distribution of individual forecasts;

(b) methods based on models' past forecasting performance and in particular on discounted MSFE and squared MSFE with weights given by equation (5.4) and (5.5) respectively, with discount factors $\delta = 0.9, 0.95, 1$.

Using the information from all variables in the dataset improves upon the forecast accuracy of the AR(1) model only for one- and two-quarter ahead forecasts. The forecast gains (in terms of lower RMSFE vis-à-vis the AR(1)) from the use of combination forecasts from ADL models range from 10% to 22% and from 3% to 11% for one- and two-quarter ahead forecasts respectively. For longer horizons the use of forecast combinations is not found to lead to improvements over the AR(1), except in the case of the six-quarter ahead forecasts computed using the squared discounted MSFE combination (i.e. discounting heavily forecasts from models with past large forecast errors). Nevertheless, such isolated cases of forecast gains might arise due to the small evaluation period. Overall, forecast combination methods based on models' past performance are associated with enhanced accuracy compared to simple methods (e.g. mean, median).

Table V.1: RMSFE of univariate models and forecast combinations, residential price index

Horizon (quarters)	1	2	3	4	5	6	7	8
1. Benchmark model, RMSFE								
Autoregressive of order 1: AR(1)	2.28	3.73	6.14	9.95	11.28	11.00	12.20	11.64
2. Univariate models								
Random walk	1.99	1.86	1.83	1.48	1.39	1.47	1.34	1.35
Autoregressive of order 4: AR(4)	1.08	1.27	1.29	1.34	1.39	1.47	1.34	1.28
Autoregressive of order chosen by AIC: AR(AIC)	1.01	1.15	1.21	1.28	1.31	1.41	1.24	1.15
Autoregressive of order chosen by BIC: AR(BIC)	1.00	1.01	1.17	1.24	1.27	1.36	1.16	1.16
Autoregressive moving average of order 1: ARMA(1,1)	1.57	1.00	1.19	0.95	0.90	1.06	1.03	1.24
Autoregressive moving average of order 4:	2.48	1.55	1.54	1.21	1.58	2.03	2.26	2.46

ARMA(4,4)								
Moving average of order 1: MA(1)	3.49	4.28	2.81	1.82	1.71	1.90	1.87	2.12
Moving average of order 4: MA(4)	2.26	1.88	2.00	1.62	1.64	1.81	1.78	2.02
3. Forecast combinations, all ADL models								
Median	0.90	0.97	1.27	1.32	1.31	1.40	1.40	1.42
Mean	0.88	0.96	1.30	1.32	1.28	1.36	1.37	1.35
Trimmed mean (5% trimming)	0.88	0.96	1.29	1.32	1.29	1.39	1.39	1.38
Discounted MSFE (0.90)	0.81	0.93	1.25	1.25	1.21	1.26	1.34	1.30
Discounted MSFE (0.95)	0.81	0.93	1.25	1.26	1.22	1.27	1.35	1.30
Discounted MSFE (1.00)	0.81	0.94	1.25	1.26	1.22	1.27	1.35	1.30
Squared discounted MSFE (0.90)	0.78	0.89	1.28	1.11	1.01	0.89	1.32	1.06
Squared discounted MSFE (0.95)	0.78	0.90	1.29	1.11	1.02	0.89	1.32	1.07
Squared discounted MSFE (1.00)	0.78	0.91	1.30	1.12	1.03	0.89	1.32	1.07
4. Forecast combinations, a subset of ADL models								
Domestic and foreign/international predictors								
Median	0.90	0.97	1.28	1.33	1.31	1.40	1.41	1.43
Mean	0.89	0.97	1.33	1.32	1.29	1.35	1.35	1.33
Trimmed mean (5% trimming)	0.89	0.96	1.31	1.32	1.30	1.38	1.38	1.38
Discounted MSFE (0.90)	0.80	0.93	1.23	1.25	1.23	1.32	1.33	1.24
Discounted MSFE (0.95)	0.81	0.93	1.23	1.25	1.23	1.32	1.33	1.24
Discounted MSFE (1.00)	0.81	0.93	1.24	1.26	1.24	1.32	1.33	1.24
Squared discounted MSFE (0.90)	0.77	0.90	1.19	1.12	1.04	1.10	1.27	0.93
Squared discounted MSFE (0.95)	0.77	0.91	1.20	1.13	1.06	1.11	1.28	0.94
Squared discounted MSFE (1.00)	0.77	0.92	1.21	1.14	1.07	1.12	1.28	0.96
Domestic predictors								
Median	0.90	0.96	1.24	1.31	1.29	1.38	1.37	1.41
Mean	0.89	0.95	1.25	1.26	1.23	1.30	1.28	1.28
Trimmed mean (5% trimming)	0.89	0.95	1.24	1.28	1.25	1.34	1.32	1.33
Discounted MSFE (0.90)	0.80	0.94	1.20	1.19	1.18	1.25	1.27	1.14
Discounted MSFE (0.95)	0.80	0.95	1.21	1.20	1.18	1.25	1.27	1.14
Discounted MSFE (1.00)	0.80	0.95	1.21	1.20	1.19	1.26	1.27	1.15
Squared discounted MSFE (0.90)	0.78	0.92	1.16	1.07	1.01	0.95	1.20	0.86
Squared discounted MSFE (0.95)	0.78	0.92	1.17	1.08	1.02	0.96	1.20	0.88
Squared discounted MSFE (1.00)	0.79	0.93	1.18	1.09	1.04	0.98	1.21	0.89
International/foreign predictors								
Median	0.89	1.00	1.37	1.40	1.35	1.45	1.50	1.48
Mean	0.89	1.02	1.47	1.45	1.39	1.44	1.47	1.42
Trimmed mean (5% trimming)	0.88	1.01	1.43	1.41	1.38	1.46	1.49	1.45
Discounted MSFE (0.90)	0.86	0.97	1.34	1.54	1.37	1.47	1.50	1.44
Discounted MSFE (0.95)	0.86	0.98	1.34	1.54	1.37	1.47	1.50	1.44
Discounted MSFE (1.00)	0.86	0.98	1.34	1.54	1.37	1.47	1.50	1.44
Squared discounted MSFE (0.90)	0.85	0.99	1.35	1.69	1.30	1.49	1.51	1.47
Squared discounted MSFE (0.95)	0.85	1.00	1.35	1.69	1.30	1.49	1.51	1.47
Squared discounted MSFE (1.00)	0.85	1.00	1.36	1.70	1.30	1.49	1.51	1.47

Similar results are obtained when the forecast combinations are constructed from a subset of ADL models that include domestic or foreign/international variables related to the property market. In particular, the forecast precision is higher

compared to that of the AR(1) for one-and two-quarter ahead forecasts with gains of 11%-23% and 3%-10% respectively. A small improvement over the AR(1) might be achieved at the end of the forecast horizon when a squared discounted MSFE combination is employed. Within the subset of predictors relating to the real estate market we focus on domestic series to construct ADL forecast combinations. For a horizon of up to two quarters, the resulting forecast combinations outperform the AR(1) but are not superior to combinations based on all predictors; or, on the subset of domestic and foreign predictors discussed above. For longer horizons, combinations from ADL models with domestic predictors generate more accurate forecasts than combinations that use a larger set of both domestic and foreign variables. Nevertheless, these forecasts combinations do not lead to improvements over the AR(1), except in the case of the squared discounted MSFE combinations for six- and eight-quarter ahead forecasts.

Forecast combinations constructed from the subset of international/foreign predictors connected to the property market result in the least accurate combination forecasts, especially for long horizons. It should be stressed that the assessment of the forecasting performance for longer horizons (e.g. beyond four quarters ahead) relies on particularly short evaluation periods, due to the short time span of the residential property price index. Thus, the forecasting performance should be re-evaluated with the addition of new price index observations.

V.2.2 Land/plot price index[22]

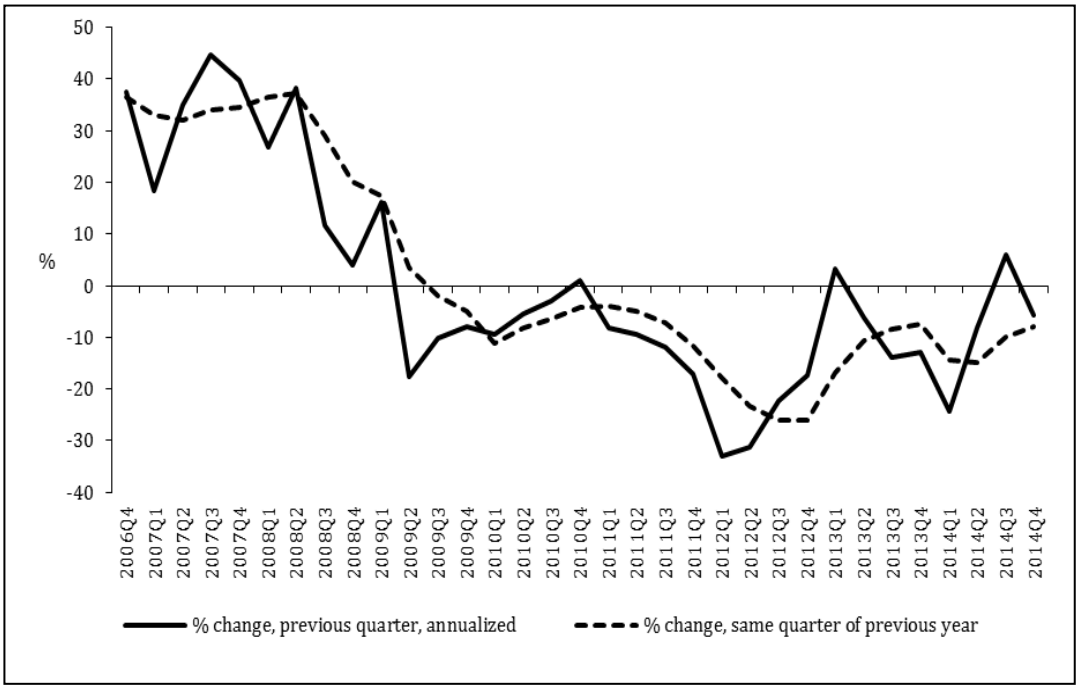
The variable to be forecasted is defined as before, as $p_{t+h}^{h} = (400/h)(\ln P_{t+h} - \ln P_t)$ where P_t now is the land/plot price index.[23] Figure V.2 shows p_{t+h}^{h} for $h = 1$ and $h = 4$, namely the percentage change of the land/plot price index with respect to the previous quarter (expressed as an annualized rate of change) and the same quarter of the previous year respectively. The prices of land/plot were increasing from 2006 until early in 2009; afterwards they have been falling. The largest declines of the index were recorded in 2012. The period of rapid growth in land/plot prices and the two large dips in 2012 and 2014 are modelled with dummy variables.

[22] The results presented in this subsection are preliminary and will be revised when more data are collected.

[23] The smoothed (four period moving average) aggregate land/plot price index is used.

Table V.2 shows the results of the forecasting exercise for the land/plot price index using the same models and forecast combination methods as in the case of the residential property price index.[24] Due to the short time series for the land/plot price index the forecast horizon is at most four quarters.[25] The table presents the RMSFE relative to that of the AR(1) which is used as the benchmark model.

Figure V.2: Percentage change of land/plot price index



The AR(4) model is associated with the best forecasting performance over the four-quarter horizon in the class of univariate models (second panel of Table V.2). The forecast accuracy of the AR(4) model is only marginally higher than that of the AR(1) for horizons of one and three quarters; the performance of the two models is about the same for two-quarter ahead forecasts. For a longer horizon of four quarters the use of the AR(4) leads to forecast gains of 20% over the benchmark. The ARMA models are found to improve considerably upon the AR(1) precision but only for one-quarter ahead forecasts; for longer horizons the

[24] The period for which the pseudo out of sample forecasts are constructed varies with the forecast horizon. More specifically, the periods are: 2010Q4-2014Q4 (h=1), 2011Q3-2014Q4 (h=2), 2012Q2-2014Q4 (h=3), 2013Q1-2014Q4 (h=4).

[25] The time series for the land/plot price index will be extended so that the index prior to smoothing will start in 2000Q1 and its smoothed version (MA(4)) in 2000Q4. With longer time series the forecasting horizon can be extended to eight quarters.

forecast error of ARMA models increases significantly compared to that of the benchmark.

Looking at the performance of forecast combinations constructed from (i) all predictors in the dataset and (ii) a subset of series in the dataset that are deemed relevant to the real estate market (panel 3 and 4 of Table V.2 respectively), we observe minimal forecast gains compared to the AR(1), only for one to three-quarter ahead forecasts. Thus, information from a wide range of macroeconomic and financial series does not seem to enhance the accuracy of the forecasts for the land/plot price index.

For the two nearest horizons, gains from forecast combinations are estimated at most at 4% and are achieved by (squared discounted MSFE) combinations of domestic predictors related to the property market. As the forecast error of the benchmark model rises substantially for three-quarter ahead forecasts, gains from forecast combinations increase slightly reaching at most 6% in the case of simple combinations (e.g. median, mean) of solely domestic or domestic and international/foreign predictors connected to the real estate market. No forecast combination considered outperforms the AR(1) at four-quarter ahead forecasting.

Table V.2: RMSFE of univariate models and forecast combinations, land/plot price index

Horizon (quarters)	1	2	3	4
1. Benchmark model, RMSFE				
Autoregressive of order 1: AR(1)	3.15	5.71	8.37	4.43
2. Univariate models				
Random walk	1.26	1.23	1.21	1.20
Autoregressive of order 4: AR(4)	0.97	1.01	0.98	0.80
Autoregressive of order chosen by AIC: AR(AIC)	1.00	1.02	1.00	1.21
Autoregressive of order chosen by BIC: AR(BIC)	1.03	1.07	1.00	1.21
Autoregressive moving average of order 1: ARMA(1,1)	0.79	0.99	1.04	2.81
Autoregressive moving average of order 4: ARMA(4,4)	0.80	1.08	1.38	4.21
Moving average of order 1: MA(1)	1.35	2.23	2.27	5.95
Moving average of order 4: MA(4)	0.99	1.17	1.74	5.45
3. Forecast combinations, all ADL models				
Median	1.01	1.00	0.95	1.19
Mean	1.02	1.00	0.95	1.07
Trimmed mean (5% trimming)	1.02	1.00	0.95	1.10
Discounted MSFE (0.90)	1.01	0.99	1.06	1.05
Discounted MSFE (0.95)	1.01	0.99	1.06	1.04
Discounted MSFE (1.00)	1.01	0.99	1.06	1.04
Squared discounted MSFE (0.90)	0.99	0.98	1.07	1.93
Squared discounted MSFE (0.95)	0.99	0.98	1.07	1.94
Squared discounted MSFE (1.00)	0.99	0.99	1.07	1.95
4. Forecast combinations, a subset of ADL models				
Domestic and foreign/international predictors				
Median	1.02	1.01	0.95	1.17
Mean	1.03	1.01	0.94	1.04
Trimmed mean (5% trimming)	1.03	1.01	0.94	1.07
Discounted MSFE (0.90)	1.01	0.99	0.95	1.10
Discounted MSFE (0.95)	1.01	0.99	0.95	1.10
Discounted MSFE (1.00)	1.01	0.99	0.95	1.10
Squared discounted MSFE (0.90)	0.99	0.97	0.96	2.28
Squared discounted MSFE (0.95)	0.99	0.97	0.96	2.29
Squared discounted MSFE (1.00)	0.99	0.97	0.96	2.30
Domestic predictors				
Median	1.01	1.00	0.94	1.15
Mean	1.01	1.00	0.94	1.03
Trimmed mean (5% trimming)	1.01	1.00	0.94	1.06
Discounted MSFE (0.90)	0.99	0.98	0.95	1.10
Discounted MSFE (0.95)	0.99	0.98	0.95	1.10
Discounted MSFE (1.00)	0.99	0.98	0.95	1.10
Squared discounted MSFE (0.90)	0.97	0.96	0.99	2.45
Squared discounted MSFE (0.95)	0.97	0.96	0.99	2.46
Squared discounted MSFE (1.00)	0.96	0.96	0.99	2.47
International/foreign predictors				
Median	1.05	1.05	0.95	1.20
Mean	1.05	1.03	0.96	1.10
Trimmed mean (5% trimming)	1.06	1.03	0.95	1.11

Discounted MSFE (0.90)	1.05	1.01	0.97	1.10
Discounted MSFE (0.95)	1.05	1.01	0.97	1.10
Discounted MSFE (1.00)	1.05	1.01	0.97	1.10
Squared discounted MSFE (0.90)	1.04	1.01	0.98	1.12
Squared discounted MSFE (0.95)	1.04	1.01	0.98	1.12
Squared discounted MSFE (1.00)	1.04	1.01	0.98	1.12

V.3 Concluding remarks

As mentioned above due to the short time series for both the residential and the land/plot price index and, consequently, the resulting small period for the forecast evaluation exercises, it is difficult to extract strong conclusions about a best performing model or combination method. Nevertheless, the results for short horizons that are derived using a larger sample for the evaluation period compared to longer horizons, indicate that forecast gains (or at least no losses) can be generated by forecasting the property price indices using forecast combinations of ADL models that utilise information from a large number of predictors. Moreover, a subset of predictors (especially domestic series) relevant to the Cyprus property market seems promising for forecasting purposes.

The construction of forecasts via a forecast combination method which incorporates information from other economic and financial series allows the computation of the contribution of each group of predictors (e.g. domestic vs. foreign, banking sector vs. real economy-related, etc.) to the formation of the final forecasts, thus conclusions about the macroeconomic factors driving the forecasts can be drawn.

The forecasting performance should be re-evaluated with the addition of new observations for the price indices that will enable the use of richer dynamics as the time series dimension becomes longer. Furthermore, a longer time series will allow an extension of the forecasting horizon to be achieved in the case of the land/plot price index.

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APPENDIX A: NEWSPAPERS ARCHIVE

Table A1: Residential properties

2014	Q1						Q2						Q3						Q4					
	5/1-Sun	19/1-Sun	2/2-Sun	16/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	13/4-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	19/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	13/4-Sun	✓	✓	✓	✓	✓	✓	✓	16/8-Sat	✓	✓	✓	✓	✓	✓	✓	✓
	3/1-Fri		7/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2013	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	3/3-Sun	17/3-Sun	7/4-Sun	21/4-Sun	5/5-Sun	19/5-Sun	2/6-Sun	16/6-Sun	7/7-Sun	21/7-Sun	4/8-Sun	18/8-Sun	1/9-Sun	15/9-Sun	6/10-Sun	20/10-Sun	3/11-Sun	17/11-Sun	1/12-Sun	15/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		1/3-Fri		5/4-Fri		3/5-Fri		7/6-Fri		5/7-Fri		2/8-Fri		6/9-Fri		4/10-Fri		1/11-Fri		6/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		10/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2012	Q1						Q2						Q3						Q4					
	1/1-Sun	15/1-Sun	5/2-Sun	19/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	22/4-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	22/4-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	22/4-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6/1-Fri		3/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2011	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	6/3-Sun	20/3-Sun	3/4-Sun	17/4-Sun	1/5-Sun	15/5-Sun	5/6-Sun	19/6-Sun	3/7-Sun	17/7-Sun	7/8-Sun	21/8-Sun	4/9-Sun	18/9-Sun	2/10-Sun	16/10-Sun	6/11-Sun	20/11-Sun	4/12-Sun	18/12-Sun
Phileleftheros	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	1/1-Sat	23/1-Sun	✓	✓	✓	✓	✓	✓	✓	22/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	9/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		4/3-Fri		1/4-Fri		6/5-Fri		3/6-Fri		1/7-Fri		5/8-Fri		2/9-Fri		7/10-Fri		4/11-Fri		2/12-Fri	
Xryses Efkairies	14/1-Fri		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2010	Q1						Q2						Q3						Q4					
	3/1-Sun	17/1-Sun	7/2-Sun	21/2-Sun	7/3-Sun	21/3-Sun	4/4-Sun	18/4-Sun	2/5-Sun	16/5-Sun	6/6-Sun	20/6-Sun	4/7-Sun	18/7-Sun	1/8-Sun	15/8-Sun	5/9-Sun	19/9-Sun	3/10-Sun	17/10-Sun	7/11-Sun	21/11-Sun	5/12-Sun	19/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	3/4-Sat	✓	3/5-Mon	23/5-Sun	✓	✓	✓	✓	✓	22/8-Sun	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	24/1-Sun	✓	✓	✓	✓	3/4-Sat	✓	1/5-Sat	23/5-Sun	✓	✓	✓	✓	✓	22/8-Sun	✓	✓	✓	24/10-Sun	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	3/4-Sat	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1/1-Fri		5/2-Fri		5/3-Fri		2/4-Fri		7/5-Fri		4/6-Fri		2/7-Fri		6/8-Fri		3/9-Fri		1/10-Fri		5/11-Fri		3/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2009	Q1						Q2						Q3						Q4					
	4/1-Sun	18/1-Sun	1/2-Sun	15/2-Sun	1/3-Sun	15/3-Sun	5/4-Sun	19/4-Sun	3/5-Sun	17/5-Sun	7/6-Sun	21/6-Sun	5/7-Sun	19/7-Sun	2/8-Sun	16/8-Sun	6/9-Sun	20/9-Sun	4/10-Sun	18/10-Sun	1/11-Sun	15/11-Sun	6/12-Sun	20/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	26/4-Sun	✓	✓	✓	✓	✓	✓	✓	17/8-Mon	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	22/3-Sun	✓	22/4-Wed	✓	24/5-Sun	✓	✓	✓	✓	✓	23/8-Sun	✓	✓	✓	✓	✓	22/11-Sun	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	18/4-Sat	✓	✓	✓	✓	✓	✓	✓	15/8-Sat	✓	✓	✓	✓	✓	✓	✓	✓
	2/1-Fri		5/2-Fri		5/3-Fri		3/4-Fri		1/5-Fri		5/6-Fri		3/7-Fri		7/8-Fri		4/9-Fri		2/10-Fri		6/11-Fri		4/12-Fri	
Xryses Efkairies	✓		6/2-Sat		6/3-Sat		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2008	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Phileleftheros	13/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	13/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	23/11-Sun	✓	✓
Politis	13/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		9/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2007	Q1						Q2						Q3						Q4					
	7/1-Sun	21/1-Sun	4/2-Sun	18/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1/12-Sat	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	22/4-Sun	✓	✓	✓	✓	✓	22/7-Sun	✓	✓	✓	23/9-Sun	✓	✓	✓	✓	✓	23/12-Sun
Politis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	16/7-Mon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5/1-Fri		2/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		8/6-Fri		✓		✓		✓		✓		✓		✓	

Table A1: Residential properties (continued)

2006	Q1						Q2						Q3						Q4					
	1/1-Sun	15/1-Sun	5/2-Sun	19/2-Sun	5/3-Sun	19/3-Sun	2/4-Sun	16/4-Sun	7/5-Sun	21/5-Sun	4/6-Sun	18/6-Sun	2/7-Sun	16/7-Sun	6/8-Sun	20/8-Sun	3/9-Sun	17/9-Sun	1/10-Sun	15/10-Sun	5/11-Sun	19/11-Sun	3/12-Sun	17/12-Sun
Philelefthe ros	✓	22/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	23/7-Sun	✓	✓	✓	✓	✓	22/10-Sun	✓	✓	✓	✓
Politis	✓	15/1-Sun	✓	18/2-Sat	✓	✓	✓	✓	✓	20/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6/1-Fri		3/2-Fri		3/3-Fri		7/4-Fri		5/5-Fri		2/6-Fri		7/7-Fri		4/8-Fri		1/9-Fri		6/10-Fri		3/11-Fri		1/12-Fri	
Xryses Efkairies	13/1-Fri		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2005	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	6/3-Sun	20/3-Sun	3/4-Sun	17/4-Sun	1/5-Sun	15/5-Sun	5/6-Sun	19/6-Sun	3/7-Sun	17/7-Sun	7/8-Sun	21/8-Sun	4/9-Sun	18/9-Sun	2/10-Sun	16/10-Sun	6/11-Sun	20/11-Sun	4/12-Sun	18/12-Sun
Philelefthe ros	1/1-Sat	23/1-Sun	✓	✓	✓	✓	✓	✓	8/5-Sun	22/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	23/10-Sun	✓	✓	✓	✓
Cyprus Mail	9/1-Sun	23/1-Sun	✓	✓	✓	✓	5/4-Tue	✓	8/5-Sun	✓	✓	✓	2/7-Sat	✓	✓	✓	✓	✓	✓	23/10-Sun	8/11-Tue	✓	✓	✓
Politis	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	3/5-Tue	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		4/3-Fri		1/4-Fri		6/5-Fri		3/6-Fri		1/7-Fri		5/8-Fri		2/9-Fri		7/10-Fri		4/11-Fri		2/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2004	Q1						Q2						Q3						Q4					
	4/1-Sun	18/1-Sun	1/2-Sun	15/2-Sun	7/3-Sun	21/3-Sun	4/4-Sun	18/4-Sun	2/5-Sun	16/5-Sun	6/6-Sun	20/6-Sun	4/7-Sun	18/7-Sun	1/8-Sun	15/8-Sun	5/9-Sun	19/9-Sun	3/10-Sun	17/10-Sun	7/11-Sun	21/11-Sun	5/12-Sun	19/12-Sun
Philelefthe ros	✓	✓	✓	✓	✓	✓	✓	✓	1/5-Sat	23/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	20/3-Sat	✓	✓	5/5-Wed	✓	✓	✓	✓	✓	✓	22/8-Sun	✓	✓	6/10-Wed	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2/1-Fri		6/2-Fri		5/3-Fri		2/4-Fri		7/5-Fri		4/6-Fri		2/7-Fri		6/8-Fri		3/9-Fri		1/10-Fri		5/11-Fri		3/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2003	Q1						Q2						Q3						Q4					
	5/1-Sun	19/1-Sun	2/2-Sun	16/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Philelefthe ros	✓	✓	3/2-Mon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	22/6-Sun	✓	✓	10/8-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3/1-Fri		7/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		11/4-Fri		9/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2002	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	3/3-Sun	17/3-Sun	7/4-Sun	21/4-Sun	5/5-Sun	19/5-Sun	2/6-Sun	16/6-Sun	7/7-Sun	21/7-Sun	4/8-Sun	18/8-Sun	1/9-Sun	15/9-Sun	6/10-Sun	20/10-Sun	3/11-Sun	17/11-Sun	1/12-Sun	15/12-Sun
Philelefthe ros	7/1-Mon	✓	✓	✓	✓	✓	✓	✓	4/5-Sat	✓	✓	✓	✓	20/7-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	4/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		1/3-Fri		5/4-Fri		3/5-Fri		7/6-Fri		5/7-Fri		2/8-Fri		6/9-Fri		4/10-Fri		1/11-Fri		6/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		10/5-Fri		14/6-Fri		✓		✓		✓		✓		✓		✓	
2001	Q1						Q2						Q3						Q4					
	7/1-Sun	21/1-Sun	4/2-Sun	18/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Philelefthe ros	✓	✓	11/2-Sun	✓	5/3-Mon	✓	✓	14/4-Sat	✓	✓	✓	24/6-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5/1-Fri		2/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		9/2-Fri		✓		✓		✓		✓		✓		✓		✓		✓		16/11-Fri		✓	
2000	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	5/3-Sun	19/3-Sun	2/4-Sun	16/4-Sun	7/5-Sun	21/5-Sun	4/6-Sun	18/6-Sun	2/7-Sun	16/7-Sun	6/8-Sun	20/8-Sun	3/9-Sun	17/9-Sun	1/10-Sun	15/10-Sun	5/11-Sun	19/11-Sun	3/12-Sun	17/12-Sun
Philelefthe ros	9/1-Sun	✓	✓	✓	✓	✓	✓	✓	8/5-Mon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	9/1-Sun	23/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	9/1-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		3/3-Fri		7/4-Fri		5/5-Fri		2/6-Fri		7/7-Fri		4/8-Fri		1/9-Fri		6/10-Fri		3/11-Fri		1/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	

TABLE A2: PLOTS AND LAND

2014	Q1						Q2						Q3						Q4					
	5/1-Sun	19/1-Sun	2/2-Sun	16/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	19/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	19/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	5/4-Sat	18/4-Fri	3/5-Sat	19/5-Mon	2/6-Mon	✓	✓	✓	✓	16/8-Sat	✓	20/9-Sat	✓	✓	✓	✓	✓	✓
	3/1-Fri		7/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2013	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	3/3-Sun	17/3-Sun	7/4-Sun	21/4-Sun	5/5-Sun	19/5-Sun	2/6-Sun	16/6-Sun	7/7-Sun	21/7-Sun	4/8-Sun	18/8-Sun	1/9-Sun	15/9-Sun	6/10-Sun	20/10-Sun	3/11-Sun	17/11-Sun	1/12-Sun	15/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	12/5-Sun	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		1/3-Fri		5/4-Fri		3/5-Fri		7/6-Fri		5/7-Fri		2/8-Fri		6/9-Fri		4/10-Fri		1/11-Fri		6/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		10/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2012	Q1						Q2						Q3						Q4					
	1/1-Sun	15/1-Sun	5/2-Sun	19/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6/1-Fri		3/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2011	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	6/3-Sun	20/3-Sun	3/4-Sun	17/4-Sun	1/5-Sun	15/5-Sun	5/6-Sun	19/6-Sun	3/7-Sun	17/7-Sun	7/8-Sun	21/8-Sun	4/9-Sun	18/9-Sun	2/10-Sun	16/10-Sun	6/11-Sun	20/11-Sun	4/12-Sun	18/12-Sun
Phileleftheros	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		4/3-Fri		1/4-Fri		6/5-Fri		3/6-Fri		1/7-Fri		5/8-Fri		2/9-Fri		7/10-Fri		4/11-Fri		2/12-Fri	
Xryses Efkairies	14/1-Fri		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2010	Q1						Q2						Q3						Q4					
	3/1-Sun	17/1-Sun	7/2-Sun	21/2-Sun	7/3-Sun	21/3-Sun	4/4-Sun	18/4-Sun	2/5-Sun	16/5-Sun	6/6-Sun	20/6-Sun	4/7-Sun	18/7-Sun	1/8-Sun	15/8-Sun	5/9-Sun	19/9-Sun	3/10-Sun	17/10-Sun	7/11-Sun	21/11-Sun	5/12-Sun	19/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	3/4-Sat	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	3/4-Sat	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	3/4-Sat	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1/1-Fri		5/2-Fri		5/3-Fri		2/4-Fri		7/5-Fri		4/6-Fri		2/7-Fri		6/8-Fri		3/9-Fri		1/10-Fri		5/11-Fri		3/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2009	Q1						Q2						Q3						Q4					
	4/1-Sun	18/1-Sun	1/2-Sun	15/2-Sun	1/3-Sun	15/3-Sun	5/4-Sun	19/4-Sun	3/5-Sun	17/5-Sun	7/6-Sun	21/6-Sun	5/7-Sun	19/7-Sun	2/8-Sun	16/8-Sun	6/9-Sun	20/9-Sun	4/10-Sun	18/10-Sun	1/11-Sun	15/11-Sun	6/12-Sun	20/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	18/4-Sat	✓	✓	✓	✓	✓	✓	✓	15/8-Sat	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	18/4-Sat	✓	✓	✓	✓	✓	✓	✓	14/8-Fri	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	18/4-Sat	✓	✓	✓	✓	✓	✓	✓	15/8-Sat	✓	✓	✓	✓	✓	✓	✓	✓
	2/1-Fri		6/2-Fri		6/3-Fri		3/4-Fri		1/5-Fri		5/6-Fri		3/7-Fri		7/8-Fri		4/9-Fri		2/10-Fri		6/11-Fri		4/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2008	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Phileleftheros	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	5/1-Sat						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		9/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2007	Q1						Q2						Q3						Q4					
	7/1-Sun	21/1-Sun	4/2-Sun	18/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Phileleftheros	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5/1-Fri		2/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		8/6-Fri		✓		✓		✓		✓		✓		✓	

TABLE A2 (CONTINUED): PLOTS AND LAND

2006	Q1						Q2						Q3						Q4					
	1/1-Sun	15/1-Sun	5/2-Sun	19/2-Sun	5/3-Sun	19/3-Sun	2/4-Sun	16/4-Sun	7/5-Sun	21/5-Sun	4/6-Sun	18/6-Sun	2/7-Sun	16/7-Sun	6/8-Sun	20/8-Sun	3/9-Sun	17/9-Sun	1/10-Sun	15/10-Sun	5/11-Sun	19/11-Sun	3/12-Sun	17/12-Sun
Philelefthe ros	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	3/1-Th	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	3/1-Tue	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6/1-Fri		3/2-Fri		3/3-Fri		7/4-Fri		5/5-Fri		2/6-Fri		7/7-Fri		4/8-Fri		1/9-Fri		6/10-Fri		3/11-Fri		1/12-Fri	
Xryses Efkairies	13/1-Fri		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2005	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	6/3-Sun	20/3-Sun	3/4-Sun	17/4-Sun	1/5-Sun	15/5-Sun	5/6-Sun	19/6-Sun	3/7-Sun	17/7-Sun	7/8-Sun	21/8-Sun	4/9-Sun	18/9-Sun	2/10-Sun	16/10-Sun	6/11-Sun	20/11-Sun	4/12-Sun	18/12-Sun
Philelefthe ros	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	30/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	30/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	30/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		4/3-Fri		1/4-Fri		6/5-Fri		3/6-Fri		1/7-Fri		5/8-Fri		2/9-Fri		7/10-Fri		4/11-Fri		2/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2004	Q1						Q2						Q3						Q4					
	4/1-Sun	18/1-Sun	1/2-Sun	15/2-Sun	7/3-Sun	21/3-Sun	4/4-Sun	18/4-Sun	2/5-Sun	16/5-Sun	6/6-Sun	20/6-Sun	4/7-Sun	18/7-Sun	1/8-Sun	15/8-Sun	5/9-Sun	19/9-Sun	3/10-Sun	17/10-Sun	7/11-Sun	21/11-Sun	5/12-Sun	19/12-Sun
Philelefthe ros	✓	✓	✓	✓	✓	✓	✓	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	1/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2/1-Fri		6/2-Fri		5/3-Fri		2/4-Fri		7/5-Fri		4/6-Fri		2/7-Fri		6/8-Fri		3/9-Fri		1/10-Fri		5/11-Fri		3/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2003	Q1						Q2						Q3						Q4					
	5/1-Sun	19/1-Sun	2/2-Sun	16/2-Sun	2/3-Sun	16/3-Sun	6/4-Sun	20/4-Sun	4/5-Sun	18/5-Sun	1/6-Sun	15/6-Sun	6/7-Sun	20/7-Sun	3/8-Sun	17/8-Sun	7/9-Sun	21/9-Sun	5/10-Sun	19/10-Sun	2/11-Sun	16/11-Sun	7/12-Sun	21/12-Sun
Philelefthe ros	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3/1-Fri		7/2-Fri		7/3-Fri		4/4-Fri		2/5-Fri		6/6-Fri		4/7-Fri		1/8-Fri		5/9-Fri		3/10-Fri		7/11-Fri		5/12-Fri	
Xryses Efkairies	✓		✓		✓		11/4-Fri		9/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2002	Q1						Q2						Q3						Q4					
	6/1-Sun	20/1-Sun	3/2-Sun	17/2-Sun	3/3-Sun	17/3-Sun	7/4-Sun	21/4-Sun	5/5-Sun	19/5-Sun	2/6-Sun	16/6-Sun	7/7-Sun	21/7-Sun	4/8-Sun	18/8-Sun	1/9-Sun	15/9-Sun	6/10-Sun	20/10-Sun	3/11-Sun	17/11-Sun	1/12-Sun	15/12-Sun
Philelefthe ros	5/1-Sat	✓	✓	16/2-Sat	✓	✓	✓	✓	4/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	4/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	5/1-Sat	✓	✓	✓	✓	✓	✓	✓	4/5-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4/1-Fri		1/2-Fri		1/3-Fri		5/4-Fri		3/5-Fri		7/6-Fri		5/7-Fri		2/8-Fri		6/9-Fri		4/10-Fri		1/11-Fri		6/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		10/5-Fri		✓		✓		✓		✓		✓		✓		✓	
2001	Q1						Q2						Q3						Q4					
	7/1-Sun	21/1-Sun	4/2-Sun	18/2-Sun	4/3-Sun	18/3-Sun	1/4-Sun	15/4-Sun	6/5-Sun	20/5-Sun	3/6-Sun	17/6-Sun	1/7-Sun	15/7-Sun	5/8-Sun	19/8-Sun	2/9-Sun	16/9-Sun	7/10-Sun	21/10-Sun	4/11-Sun	18/11-Sun	2/12-Sun	16/12-Sun
Philelefthe ros	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	✓	✓	✓	✓	✓	✓	✓	14/4-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5/1-Fri		2/2-Fri		2/3-Fri		6/4-Fri		4/5-Fri		1/6-Fri		6/7-Fri		3/8-Fri		7/9-Fri		5/10-Fri		2/11-Fri		7/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
2000	Q1						Q2						Q3						Q4					
	2/1-Sun	16/1-Sun	6/2-Sun	20/2-Sun	5/3-Sun	19/3-Sun	2/4-Sun	16/4-Sun	7/5-Sun	21/5-Sun	4/6-Sun	18/6-Sun	2/7-Sun	16/7-Sun	6/8-Sun	20/8-Sun	3/9-Sun	17/9-Sun	1/10-Sun	15/10-Sun	5/11-Sun	19/11-Sun	3/12-Sun	17/12-Sun
Philelefthe ros	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyprus Mail	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Politis	1/1-Sat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7/1-Fri		4/2-Fri		3/3-Fri		7/4-Fri		5/5-Fri		2/6-Fri		7/7-Fri		4/8-Fri		1/9-Fri		6/10-Fri		3/11-Fri		1/12-Fri	
Xryses Efkairies	✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	

APPENDIX B: LIST OF VARIABLES INCLUDED IN THE FORECASTING MODELS

Description		Abbreviation
NATIONAL ACCOUNTS (€million – constant prices)		
Gross Domestic Product	*	GDPcp
Value added: Agriculture, hunting, forestry and fishing		AHFFcp
Value added: Mining, quarrying, manufacturing, and electricity, gas & water supply		MQMEGWScp
Value added: Construction	*	CONSTcp
Value added: Wholesale & retail trade, hotels &restaurants, transport, storage and communication		WRTHRTSCcp
Value added: Financial intermediation, real estate, renting and business activities	*	FIRERBcp
Value added: Public administration &defence, education, health & social work, etc.		PADEHScp
Final Consumption Expenditure		FCEcp
Final Consumption Expenditure of Households		FCEHcp
Final Consumption Expenditure of Non-Profit Institutions Serving Households		FCENPISHcp
Final Consumption Expenditure of General Government		FCEGGcp
Exports of goods and services		EOGScp
Imports of goods and services		IOGScp
Total Gross Fixed Capital Formation	*	TGFCF
Gross Fixed Capital Formation: Products of agriculture, fisheries and aquaculture		GFCFafa
Gross Fixed Capital Formation: Equipment: metal product and machinery	*	GFCFepm
Gross Fixed Capital Formation: Equipment: transport	*	GFCFte
Gross Fixed Capital Formation: Construction: housing	*	GFCFca
Gross Fixed Capital Formation: Construction: other construction	*	GFCFcoc
Gross Fixed Capital Formation: Other products	*	GFCFop
RETAIL TRADE, INDUSTRY, CONSTRUCTION, TOURISM, EXTERNAL TRADE		
Turnover Value Index of retail trade (2005=100)		TVIRT
Turnover Volume Index of retail trade (2005=100)		TVOIRT
Registration of motor vehicles (passenger cars)		RMV
Registration of motor vehicles (light goods vehicles, except for public use)		RMV2
Volume Index of Manufacturing Production act (2005=100)		VIMP
Index of production in construction	*	PROCOnst
Production Volume Index of Mining and Quarrying act (2005=100)		PVIMQ
Electricity consumption(€000's)		EAC
Electricity consumption (act 000's kWh)		EACkwc
Electricity production (act 000's kWh)		EACkwp
Total Sales of Petroleum Products (000's m.t.)		TSP
Local cement sales (million tons)	*	LCS
Building permits authorised (act no)	*	BPAN
Building permits authorised (€000's)	*	BPAM
Building permits authorised (area m2)	*	BPAA
Total imports (act €million)		TI
Total exports (incl. shipstores) (act €million)		TE
Re-exports (act €million)		REX
Imports of Petroleum for home consumption (€000's)		IPHC
Tourist arrivals		TARR
Tourist arrivals UK		TARRUK
Tourist arrivals RUS		TARRRUS
Tourist arrivals GR		TARRGR
Tourism arrivals (travellers)		TAT
LABOUR MARKET		
Total Registered Unemployed (act number)	*	TRU

Vacancies Notified (act number)		VAC
Vacancies Outstanding (act number)		OVAC
Employment-Total (000's)	*	EMP
Employment-Agriculture, Hunting and Forestry (000's)		EMPAHF
Employment-Fishing (000's)		EMPF
Employment-Mining and Quarrying (000's)		EMPMQ
Employment-Manufacturing (000's)		EMPMAN
Employment-Electricity, Gas and Water (000's)		EMPEGW
Employment-Construction (000's)		EMPCON
Employment-Wholesale and Retail Trade; Repair of motor vehicles etc. (000's)		EMPWRT
Employment-Hotels and Restaurants (000's)		EMPHR
Employment-Transport Storage and Communication (000's)		EMPTSC
Employment-Financial Intermediation (000's)		EMPFI
Employment-Real estate, renting and business activities (000's)		EMPRRB
Employment-Public administration & defence; Compulsory social security (000's)		EMPPAD
Employment-Education (000's)		EMPEDU
Employment-Health and social work (000's)		EMPHSW
Employment-Other community, social and personal service activities (000's)		EMPOCS
Employment- Education (000's)		EMPPH1
Employment- Human health and social work activities (000's)		EMPPH2
Employment- Arts, entertainment and recreation (000's)		EMPPH3
Employment- Other service activities (000's)		EMPPH4
Employment- Activities of households as employers etc. (000's)		EMPPH5
Total foreign workers in Cyprus	*	TFW
Registered Unemployed-Agriculture, Forestry and Fishing (act number)		RUAFF
Registered Unemployed-Mining and Quarrying (act number)		RUMQ
Registered Unemployed-Manufacturing Total (act number)		RUMT
Registered Unemployed-Electricity, Gas &Water(act number)		RUGW
Registered Unemployed-Construction(act number)		RUC
Registered Unemployed-Wholesale & Retail Trade (act number)		RUWRT
Registered Unemployed-Restaurants & Hotels (act number)		RURH
Registered Unemployed-Transport, Storage & Communication (act number)		RUTSC
Registered Unemployed-Newcomers (act number)		RUN
Unemployment Rate (Eurostat)[2]	*	UnmRat
Index of labour cost in construction (2005=100)	*	ILCC
INTEREST RATES, LOANS, DEPOSITS, RESERVES		
Personal Lending Rate		PLR
One-year Time Deposits		1YTD
Interest Rates: Lending for House Purchase (Outstanding amounts)- Maturity Up to 1 year	*	LEND1
Interest Rates: Lending for House Purchase (Outstanding amounts)- Maturity Up to 5 year	*	LEND2
Interest Rates: Lending for House Purchase (Outstanding amounts)- Maturity Over 5 years	*	LEND3
Interest Rates: Lending for House Purchase (New Business)-Floating Rate and up to 1 year initial rate fixation	*	LEND4
Interest Rates: Lending for House Purchase (New Business)-Annual percentage rate of charge	*	LEND5
Total Monetary Financial Institutions (MFI) loans to non-MFIs	*	MFILNS_TOT
Loans to domestic residents, outstanding amounts	*	MFILNS_RES
Total deposits of non-MFIs held with MFIs, outstanding amounts	*	DEPMFIS_TOT
Deposits of non-MFIs held with MFIs, domestic residents, outstanding amounts	*	DEPMFIS_RES
International Reserves (€)		IRES
Gold national valuation (€)		GNVAL
DOMESTIC PRICES		
Consumer Price Index (Statistical Service)	*	CPI
CPI-Food and non-alcoholic beverages (2005=100)	*	CPIF
CPI-Alcoholic beverages and tobacco (2005=100)	*	CPIA

CPI-Clothing and footwear (2005=100)	*	CPICF
CPI-Housing, water, electricity and gas (2005=100)	*	CPIHW
CPI-Furnishings, household equipment and supplies (2005=100)	*	CPIFH
CPI-Health (2005=100)	*	CPIH
CPI-Transport (2005=100)	*	CPIT
CPI-Communication (2005=100)	*	CPICOM
CPI-Recreation and culture (2005=100)	*	CPIRC
CPI-Education (2005=100)	*	CPIEDU
CPI-Restaurants and hotels (2005=100)	*	CPIRH
CPI-Miscellaneous goods and services (2005=100)	*	CPIMISC
Harmonized Consumer Price Index	*	HCPI
Harmonized Consumer Prices-Communications		HCPIC
Harmonized Consumer Prices-Electricity		HCPIE
Harmonized Consumer Prices-Energy		HCPIEN
Harmonized Consumer Prices-Food		HCPIF
Harmonized Consumer Prices-Health		HCPIH
Harmonized Consumer Prices-Industrial Goods		HCPIIG
Harmonized Consumer Prices-Motor Cars		HCPIMC
Harmonized Consumer Prices-Pharmaceutical Products		HCPIPP
Harmonized Consumer Prices-Transport		HCPIT
Harmonized Consumer Prices-Water Supply		HCPIWS
GDP deflator		DEFLATOR
Output price index in construction	*	OUTPUTCONSt
Price index of construction materials	*	CONSTRMATER
CYPRUS STOCK EXCHANGE (CSE)		
CSE All Share Composite	*	CSEA
CSE Hotels Index		CSEH
CSE Investment Companies		CSEIC
CYPRUS ECONOMIC SENTIMENT INDICATORS		
Economic Sentiment Indicator	*	CYESI
Industry Confidence Indicator	*	CYINDU
Services Confidence Indicator	*	CYSERV
Retail Confidence Indicator	*	CYRETA
Construction Confidence Indicator	*	CYBUIL
Consumer Confidence Indicator (European Commission)	*	CYCONS
Consumer Confidence Indicator (Economics Research Centre)	*	New CCI
Business situation development over the past 3 months		SERV.CY.TOT.1.BS.M
Evolution of the demand over the past 3 months		SERV.CY.TOT.2.BS.M
Expectation of the demand over the next 3 months		SERV.CY.TOT.3.BS.M
Evolution of the employment over the past 3 months		SERV.CY.TOT.4.BS.M
Expectations of the employment over the next 3 months		SERV.CY.TOT.5.BS.M
Expectations of the prices over the next 3 months		SERV.CY.TOT.6.BS.M
Business activity (sales) development over the past 3 months		RETA.CY.TOT.1.BS.M
Volume of stock currently hold		RETA.CY.TOT.2.BS.M
Orders expectations over the next 3 months		RETA.CY.TOT.3.BS.M
Business activity expectations over the next 3 months		RETA.CY.TOT.4.BS.M
Employment expectations over the next 3 months		RETA.CY.TOT.5.BS.M
Prices expectations over the next 3 months		RETA.CY.TOT.6.BS.M
Production trend observed in recent months		INDU.CY.TOT.1.BS.M
Assessment of order-book levels		INDU.CY.TOT.2.BS.M
Assessment of export order-book levels		INDU.CY.TOT.3.BS.M
Assessment of stocks of finished products		INDU.CY.TOT.4.BS.M
Production expectations for the months ahead		INDU.CY.TOT.5.BS.M

Selling price expectations for the months ahead		INDU.CY.TOT.6.BS.M
Employment expectations for the months ahead		INDU.CY.TOT.7.BS.M
Building activity development over the past 3 months	*	BUIL.CY.TOT.1.BS.M
Evolution of your current overall order books	*	BUIL.CY.TOT.3.BS.M
Employment expectations over the next 3 months	*	BUIL.CY.TOT.4.BS.M
Prices expectations over the next 3 months	*	BUIL.CY.TOT.5.BS.M
Financial situation over last 12 months	*	CONS.CY.TOT.1.BS.M
Financial situation over next 12 months	*	CONS.CY.TOT.2.BS.M
General economic situation over last 12 months	*	CONS.CY.TOT.3.BS.M
General economic situation over next 12 months	*	CONS.CY.TOT.4.BS.M
Price trends over last 12 months	*	CONS.CY.TOT.5.BS.M
Price trends over next 12 months	*	CONS.CY.TOT.6.BS.M
Unemployment expectations over next 12 months	*	CONS.CY.TOT.7.BS.M
Major purchases at present	*	CONS.CY.TOT.8.BS.M
Major purchases over next 12 months	*	CONS.CY.TOT.9.BS.M
Savings at present	*	CONS.CY.TOT.10.BS.M
Savings over next 12 months	*	CONS.CY.TOT.11.BS.M
Statement on financial situation of household	*	CONS.CY.TOT.12.BS.M
Intention to buy a car within the next 12 months	*	CONS.CY.TOT.13.BS.Q
Purchase or build a home within the next 12 months	*	CONS.CY.TOT.14.BS.Q
Home improvements over the next 12 months	*	CONS.CY.TOT.15.BS.Q
OTHER DOMESTIC VARIABLES		
Population CYSTAT	*	POPTOTAL
Population (0 - 14) CYSTAT	*	POP14
Population (15 - 64) CYSTAT	*	POP64
Population (65+) CYSTAT	*	POP100
Total general government expenditure		TGGE
Total general government revenue		TGGR
EURO EXCHANGE RATES		
US dollar	*	US dollar
Pound sterling	*	Pound sterling
Swiss franc		Swiss franc
Canadian dollar		Canadian dollar
Japanese yen		Japanese yen
Russian rouble	*	Russian rouble
INTERNATIONAL STOCK MARKET INDICES		
ATHEX Composite- Price Index		ATHEX
DAX 30 Performance - Price Index		DAX30
FTSE 100 - Price Index	*	FTSE100
France CAC 40 - Price Index		FRCAC40
S&P 500 Composite - Price Index	*	SP500
S&P 100 - Price Index	*	SP100
NYSE Composite - Price Index	*	NYSE
MICEX Share Price Index	*	MICEX
Europe, Euro, Dow Jones Stoxx 50 Price Index	*	Stoxx50
Japan, Japanese yen, Nikkei 225 Stock Average Index		Nikkei225
Euro area (changing composition), Euro, Dow Jones Euro Stoxx 50 Price Index	*	Stoxx50b
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Price Index		Stoxx1
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Basic Materials E Index		Stoxx2
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Consumer Goods Index		Stoxx3
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Consumer Services Index		Stoxx4
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Financials Index		Stoxx5
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Technology E Index		Stoxx6

Euro area (changing composition), Euro, Dow Jones Euro Stoxx Healthcare Index (S1ESH1E)		Stoxx7
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Industrials Index		Stoxx8
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Oil & Gas Energy Index		Stoxx9
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Telecommunications Index		Stoxx10
Euro area (changing composition), Euro, Dow Jones Euro Stoxx Utilities E Index		Stoxx11
United States, US dollar, Standard & Poors 500 Composite Index (S_PCOMP)		SP500
INTERNATIONAL COMMODITY PRICES & FOREIGN PRICE INDICES		
Brent Crude Oil (€)		BCO
Brent Crude Oil (USD)		OILBRENT
Gold Bullion Price-New York (€/Ounce) -Commodity Price		GBNY
Silver Cash Price (€/Ounce) -Commodity Prices		SCP
Harmonised Index of Consumer Prices - Greece		CPIgr
Harmonised Index of Consumer Prices - UK		CPIuk
Harmonised Index of Consumer Prices - Europe		EHCPI
FOREIGN ECONOMIC ACTIVITY INDICES		
Industry production index EU27: Mining and quarrying; manufacturing; electricity, gas, etc		MQEU27
Industry production index EA: Mining and quarrying; manufacturing; electricity, gas, etc		MQEA
Industry production index GR: Mining and quarrying; manufacturing; electricity, gas, etc		MQGR
Industry production index EU27: Mining and quarrying; manufacturing; electricity, gas, etc; construction		MQCEU27
Industry production index EA: Mining and quarrying; manufacturing; electricity, gas, etc. construction		MQCEA
Industry production index GR: Mining and quarrying; manufacturing; electricity, gas, etc; construction		MQCGR
UK per inhabitant GDP	*	UKCAP
EA per inhabitant GDP	*	EACAP
EU per inhabitant GDP	*	EUCAP
Russia per inhabitant GDP	*	RUSCAP
UK GDP	*	UKGDP
EA GDP	*	EA18GDP
EU GDP	*	EU28GDP
Russia GDP	*	RUSGDP
EU Unemployment Rate	*	EUunR
EA Unemployment Rate	*	EAunR
UK Unemployment Rate	*	UKunR
Russia Unemployment Rate	*	RUSunR
INTERNATIONAL SENTIMENT INDICATORS		
EU Industry Confidence Indicator	*	EUINDU
EU Services Confidence Indicator	*	EUSERV
EU Consumer Confidence Indicator	*	EUCONS
EU Retail Trade Confidence Indicator	*	EURETA
EU Construction Confidence Indicator	*	EUBUIL
EU Economic Sentiment Indicator	*	ESIEU
EA Industry Confidence Indicator	*	EAINDU
EA Services Confidence Indicator	*	EASERV
EA Consumer Confidence Indicator	*	EACONS
EA Retail Trade Confidence Indicator	*	EARETA
EA Construction Confidence Indicator	*	EABUIL
EA Economic Sentiment Indicator	*	ESIEA
GR Industry Confidence Indicator		GRINDU
GR Services Confidence Indicator		GRSERV
GR Consumer Confidence Indicator		GRCONS
GR Retail Trade Confidence Indicator		GRRETA
GR Construction Confidence Indicator		GRBUIL

GR Economic Sentiment Indicator		ESIGR
UK Industry Confidence Indicator	*	UKINDU
UK Services Confidence Indicator	*	UKSERV
UK Consumer Confidence Indicator	*	UKCONS
UK Retail Trade Confidence Indicator	*	UKRETA
UK Construction Confidence Indicator	*	UKBUIL
UK Economic Sentiment Indicator	*	ESIUK
INTERNATIONAL INTEREST RATES & SPREADS		
UK 10 -year Government Bond Yield		GBYUK10
GR 10 -year Government Note Yield		GNYGR10
Germany 10 -year Government Benchmark Bond Yield		GBBG10
Europe 3-month EURIBOR	*	EURIBOR3
Europe 6-month EURIBOR	*	EURIBOR6
Europe 12-month EURIBOR	*	EURIBOR12
Moody's Aaa Corporate Yield		MACY
Moody's Baa Corporate Yield		MBCY
France 10-year Government Bond Yield		IGFRA10D
France 3-month Treasury Bill Yield		ITFRA3D
UK 3-month Treasury Bill Yield		ITGBR3D
Germany 3-month Treasury Bill Yield		ITDEU3D
Greece 3-month Treasury Bill Yield		ITGRC3M
Spain 10-year Government Bond Yield		SP10Y
Italy 10-year Government Bond Yield		IT10Y
Italy 3-month Treasury Bill Yield		IT3M
Spain 3-month Treasury Bill Yield		SP3M
Spread UK (GBYUK10 - ITGBR3D)		SUKG10
Spread FRA (IGFRA10D - ITFRA3D)		SFRAG10
Spread GER (GBBG10 - ITDEU3D)		SGERG10
Spread GR (GNYGR10 - ITGRC3M)		SGRG10
Spread SP (SP10Y - SP3M)		SISP10
Spread IT (IT10Y - IT3M)		SIT10
Spread Moodys (MACY - MBCY)		SCORP

The asterisk (*) next to the description indicates a variable connected with the property market in Cyprus.

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