



Critical assessment of the New General Valuation of Cyprus; Proposal of more efficient tax assessment policies.

Thomas Dimopoulos MRICS

PhD Candidate (CUT) www.cut.ac.cy

Lecturer (NUP) www.nup.ac.cy

Managing Partner www.axiavaluers.com

Professor D. Hadjimitsis

Head of the Department of Civil Engineering and Geomatics

Cyprus University of Technology

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A. An unpopular topic

B. Cyprus' overview

C. The Data

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PART A

A. An unpopular topic

Property Taxation

PART A: An unpopular topic I

Property taxation...

- Local governments need 'easy' own revenue source!
- 'Easy' means little political responsibility ...!
- ... administrative simplicity ...!
- ... high taxpayer compliance!
- Over the years various revenue sources have been tried by countries!
- Property taxation has evolved with various tax bases!

PART A: An unpopular topic II

Property taxation...

- Taxpayers universally do not like timing of property tax payments!
- Taxpayers typically do not like ad valorem more than area basis!
 - *subjective nature of tax base determination*
 - *taxation of unrealized value growth*
 - *valuations lag market volatility*
- Taxpayers do not like revaluations in growing markets!
- Local governments need more acceptance of property tax as a way to finance local governments and provision of non-charged services

Real Estate Taxation .cy

Property Taxation

Taxes on Real Estate Properties

- **Property Acquisition / Buying Taxation**
(x4): stamp duties, transaction tax, value added tax, mortgage dues
- **Property Possession / Use Taxation (x3):**
immovable property tax, municipal rates, communal rates, sewerage rates
- **Property Separation / Sale Taxation (x1):**
capital gains tax

Real Estate Taxation .cy

Property taxation

Tax rates levied the last year (2014) are presented on the following table

S/N	Bands	Rates
1	Up to €12.500	----
2	Over 12.500 up to €40.000 (no allowance for the first €12.500)	6‰
3	From €40.001 up to €120.000	8‰
4	From €120.001 to €170.000	9‰
5	From €170.001 to €300.000	11‰
6	From €300.001 to €500.000	13‰
7	From €500.001 to €800.000	15‰
8	From €800.001 to	17‰
9	Over €3.000.001	19‰

Table : Tax rates per ‰ of MV as rated in the last General Valuation on 1.1.1980

Taxation Bases

Property
taxation

➤ COST / BENEFIT

➤ EQUITY

➤ QUALITY

Why none of the above was
achieved???

PART B

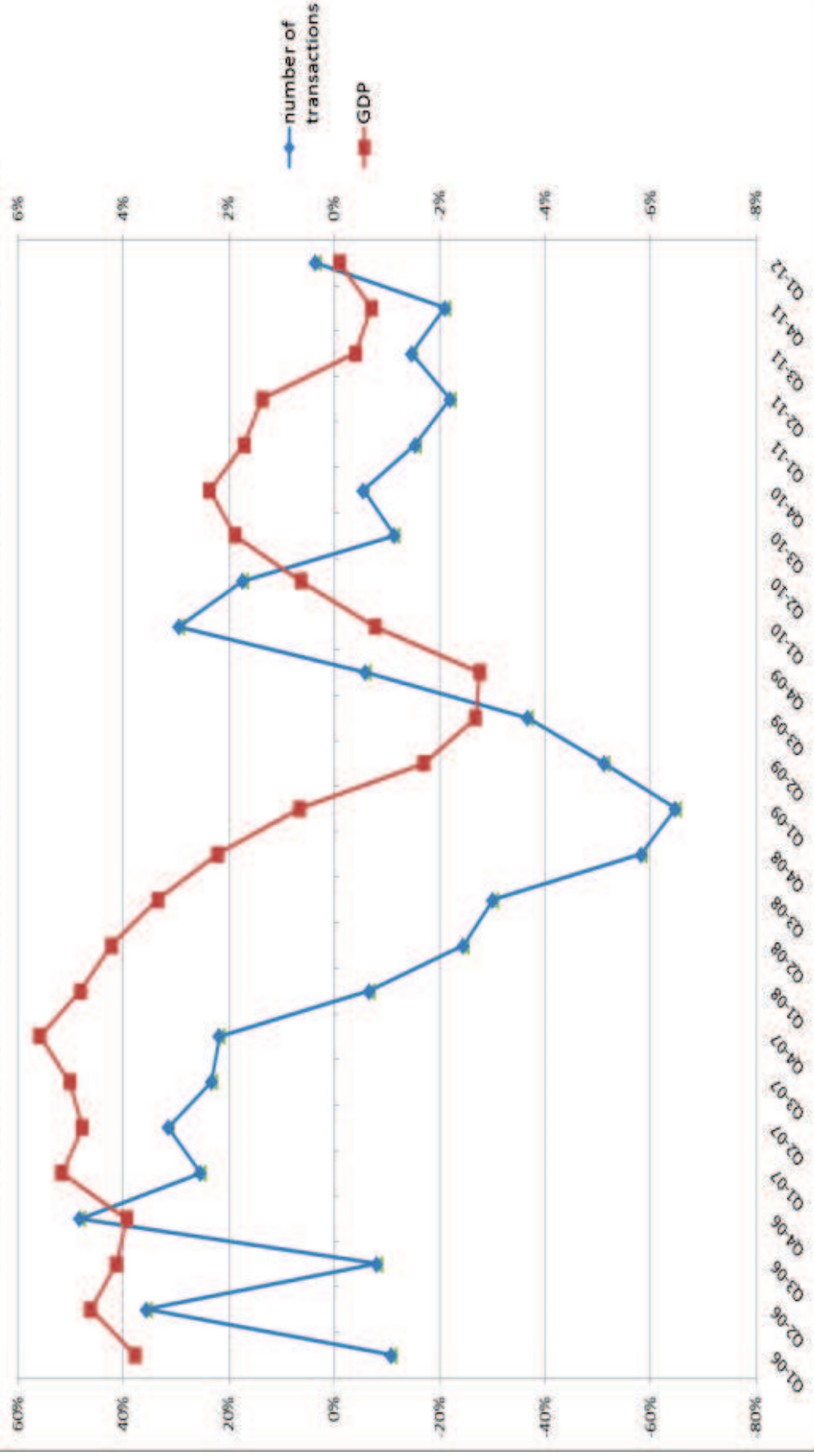
Cyprus' Overview

In R E terms

Real Estate Taxation .cy

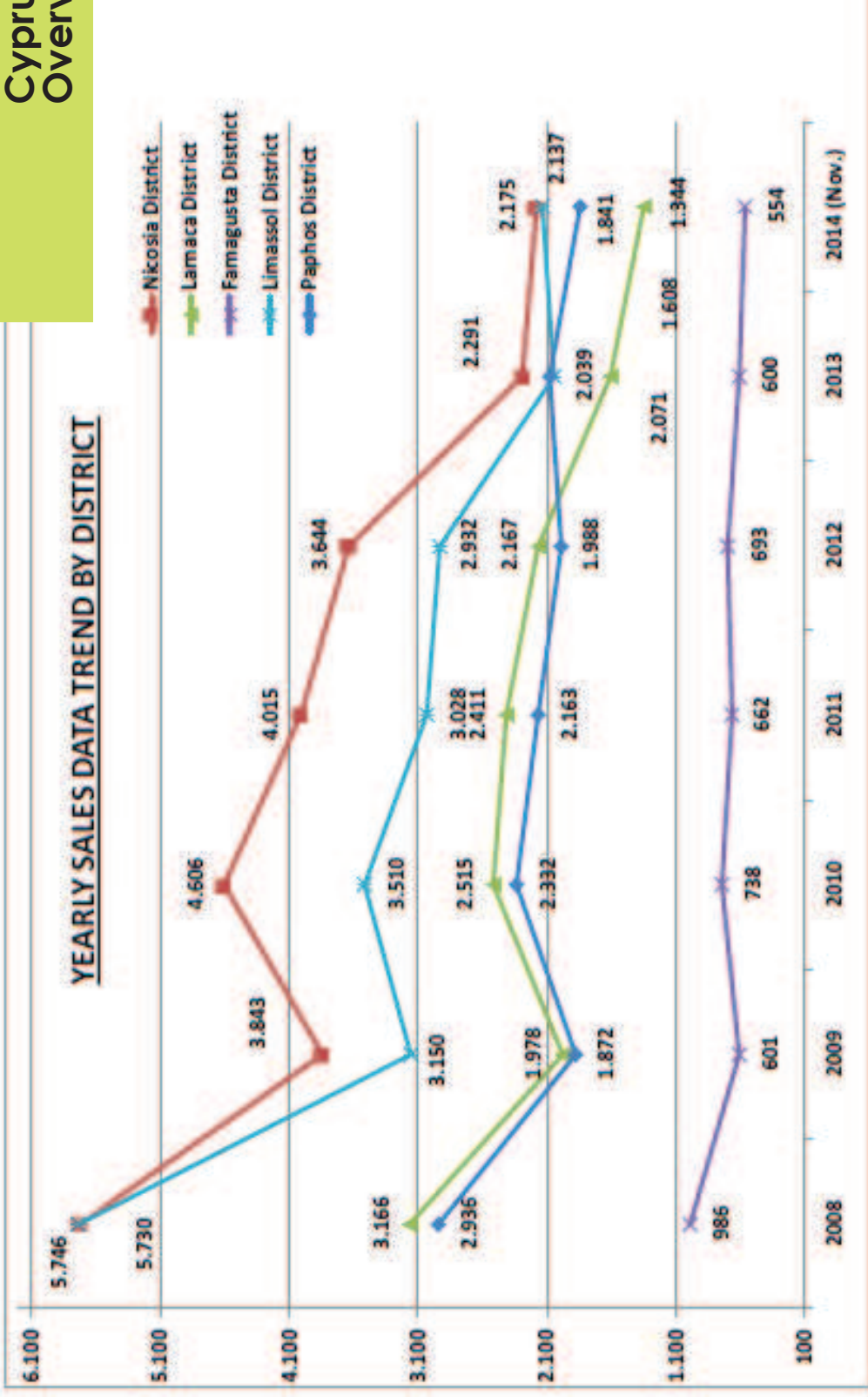
Cyprus' Overview

NUMBER OF SALES AND GDP PER QUARTER 2006-2012 (quarter %change)



Real Estate Taxation .cy

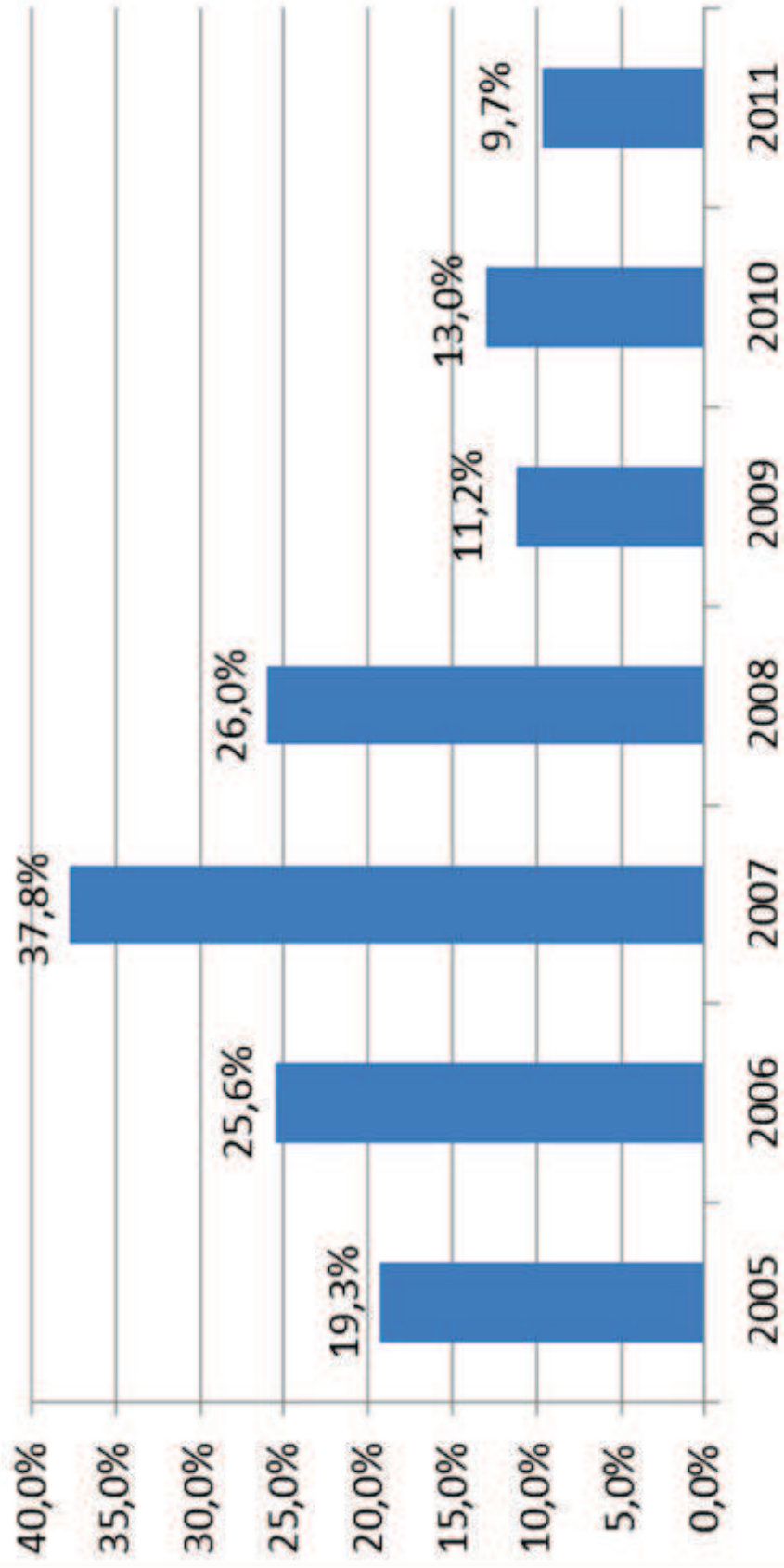
Cyprus' Overview



Real Estate Taxation .cy

Cyprus'
Overview

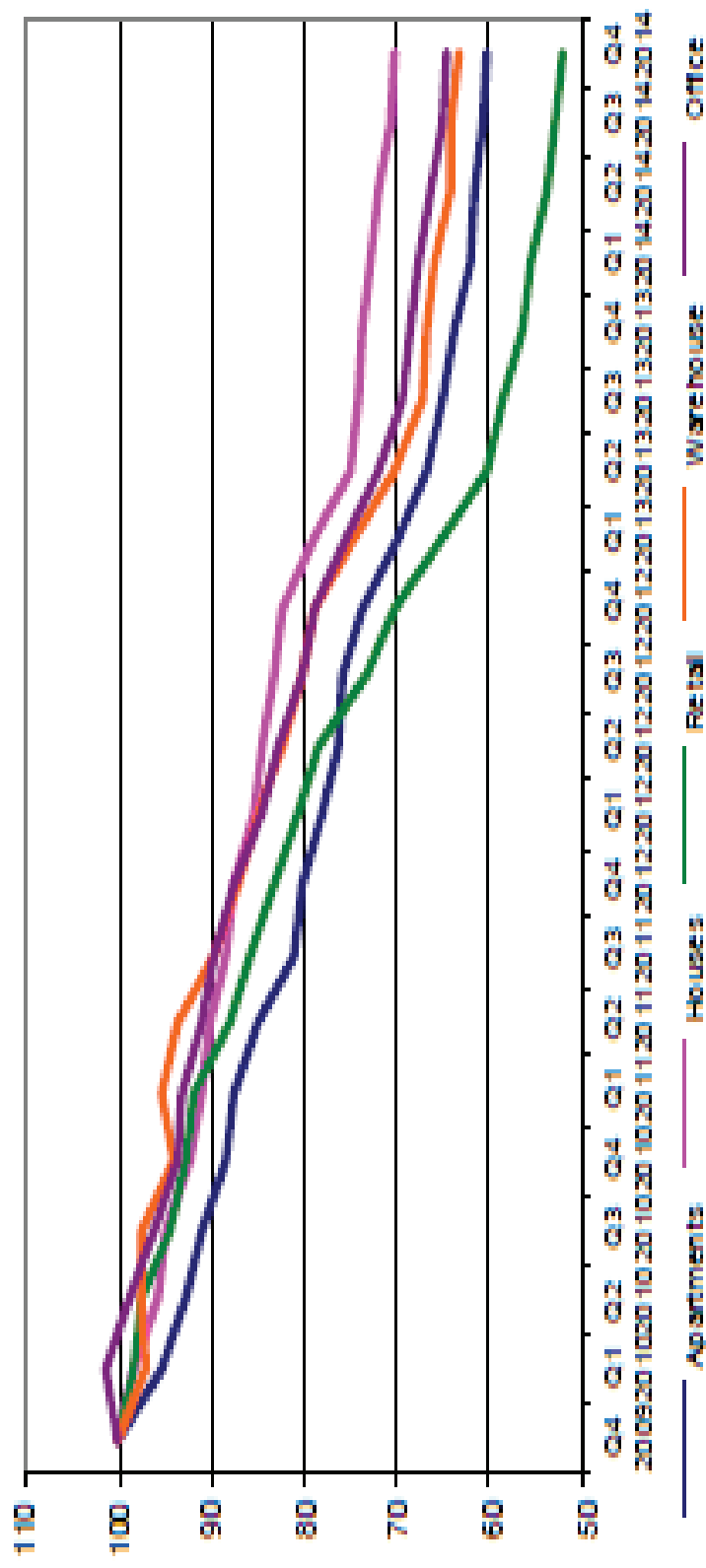
REAL ESTATE AS % OF TOTAL IRD



Real Estate Taxation .cy

Cyprus' Overview

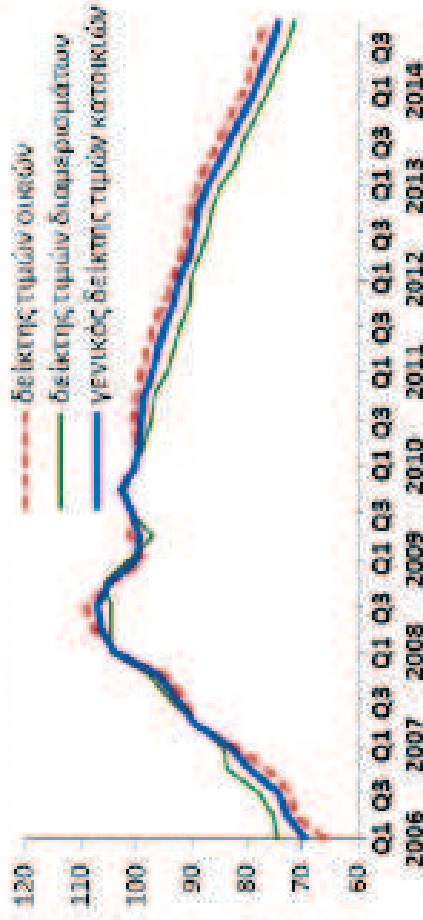
Average price index (all types)



Real Estate Taxation .cy

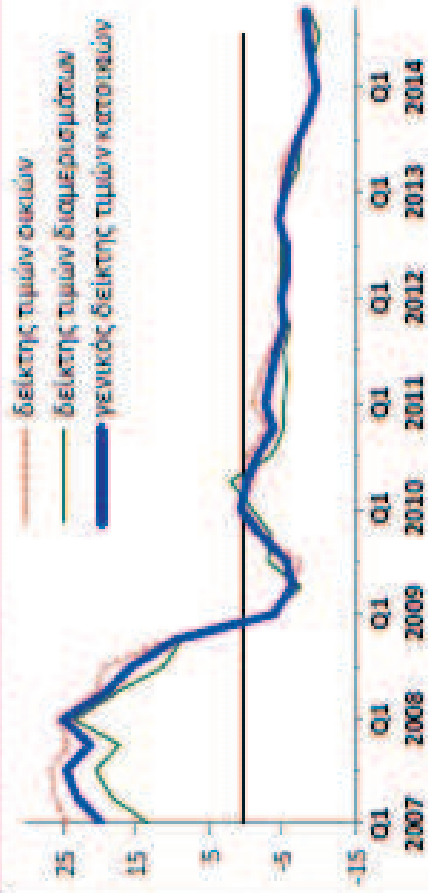
Cyprus' Overview

ΔΙΑΓΡΑΜΜΑ 1 Δείκτες τιμών οικιών και διαμερισμάτων (2010 Q1 = 100)



Πηγή: ΚΤΚ.

ΔΙΑΓΡΑΜΜΑ 2 Δείκτες τιμών οικιών και διαμερισμάτων (ετήσια μεταβολή,%)



Πηγή: ΚΤΚ.

PART C

Data

Regarding properties

Data Collection (1)

Data

- The assessor should collect and maintain sufficient property characteristics data for classification, valuation, and other purposes.
- Uniform and accurate valuation of property requires correct, complete, and up-to-date property data.
- A clear, thorough, and precise data collection manual should be developed, updated, and maintained.
- Data collection and maintenance are usually the most costly aspects of a property tax system.
- Collecting data that are of little importance in the assessment process should be avoided unless another governmental or private need is clearly demonstrated.
- The primary way to obtain property characteristic data is to physically inspect the properties. At a minimum, a comprehensive exterior inspection should be conducted.”

Data Collection (2)

Data

- Determining what data on property characteristics to collect and maintain for a computer-assisted mass appraisal system is a crucial decision with long-term consequences.
- A pilot program is one means of evaluating the benefits and costs of collecting and maintaining a particular set of property characteristics.
- In addition, much can be learned from studying the data used in other jurisdictions.
- Data should be collected in a prescribed format designed to facilitate both the collecting of data in the field and entry of data into the system.
- To ensure that data are recorded correctly and consistently, the data collection program must incorporate a comprehensive quality control system.
- Property owners who are able to access data could assist the assessment process by providing additions or corrections.

Data

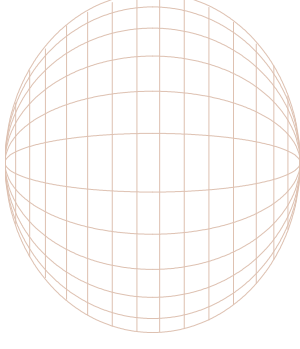
Property Tax Assessments



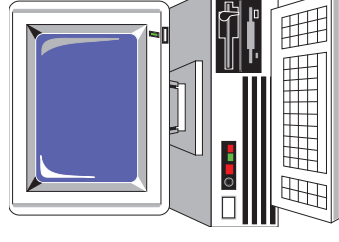
Real Property Data



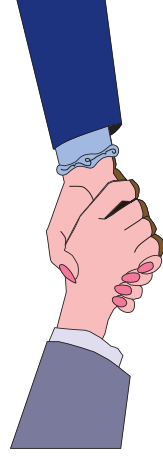
Establishing Market Value Assessments



Geographic Data



GIS/CAMA Systems



Market Data

Source: William McCluskey

Data

Market & Real Property Data

ΠΩΛΗΣΕΙΣ	District	Town	Quarte	Dis	Reg. Nc	Sheet	Plan:	Parce	Parce	Declare	Accept	DLC	DLO Fill	Fisc	Sale Accep	Sh	Sales F	Main S	Main S	Enclose	Covere	Uncove
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	5017	21 63W1	1620	642	20000	520000 Π	78	2015 ΔΙΑΜΕΓ	1/23/2015	1	1	##	ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	227	52					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	5016	21 63W1	1620	642	180000	230000 Π	80	2015 ΔΙΑΜΕΓ	1/23/2015	1	1	##	ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	255	24					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΑΓΙΑΝΤΖΙΑΣ	1	6832	21 55E2	1184	493	115000	190000 Π	90	2015 ΔΙΑΜΕΓ	1/23/2015	1	1	##	ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	137	8	21				
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	3567	21 63W1	2059	716	50000	70000 Π	106	2015 ΔΙΑΜΕΓ	1/29/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	71	8					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΛΙΑΓΙΟΣ ΑΝ'	1	2554	21 470403	1102	670	130000	130000 Π	109	2015 ΔΙΑΜΕΓ	1/29/2015	1	1		ΔΙΑΜΕΡΙΣ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΕΦΚΩΜΗΣ	1	8509	21 52E1	874	521	65000	65000 Π	126	2015 ΔΙΑΜΕΓ	2/3/2015	1	1		ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	36	9					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΛΙΠΑΝΑΓΙΑ	1	898	21 470104	51	805	75000	95000 Π	132	2015 ΔΙΑΜΕΓ	2/4/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	79	15					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΛΙΑΓΙΟΣ ΑΝ'	1	2612	21 470403	1127	676	130000	150000 Π	148	2015 ΔΙΑΜΕΓ	2/6/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΕΦΚΩΜΗΣ	1	7841	21 52E2	1123	511	145000	145000 Π	160	2015 ΔΙΑΜΕΓ	2/10/2015	1	1	##	ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	93	14	62				
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	2516	21 63W1	1886	1115	60000	105000 Π	203	2015 ΔΙΑΜΕΓ	2/17/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	94	5	6				
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	3055	21 62W2	2293	1543	65000	75000 Π	223	2015 ΔΙΑΜΕΓ	2/19/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΕΦΚΩΜΗΣ	1	4725	21 53W2	612	530	130000	250000 Π	260	2015 ΔΙΑΜΕΓ	2/25/2015	1	1	##	ΧΡΗΣΙΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	629	21 1012V04	480	906	57000	95000 Π	285	2015 ΔΙΑΜΕΓ	2/27/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΒΑΣ	1	13586	30 06W1	4450	1664	110000	110000 Π	352	2015 ΔΙΑΜΕΓ	3/9/2015	1	1		ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	78	21					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΛΙΑΓΙΟΙ ΟΜΚ	1	1789	21 540203	712	1304	55000	55000 Π	356	2015 ΔΙΑΜΕΓ	3/10/2015	1	1		ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	49	5					
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΛΙΑΓΙΟΙ ΟΜΚ	1	1117	21 540501	701	760	70000	105000 Π	417	2015 ΔΙΑΜΕΓ	3/16/2015	1	1		ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L							
	ΛΕΥΚΩΣΙΑ ΔΗΜΟΣ ΣΤΑΓΙΟΣ ΔΗΗ	1	2499	21 63W1	1886	1115	26000	32000 Π	471	2015 ΔΙΑΜΕΓ	3/23/2015	1	1	##	ΤΙΜΗΜΑ ΜΟΝΑΔΑ ΔΙΑΜΕΡΙΣ L	31	2					

Geographic Data

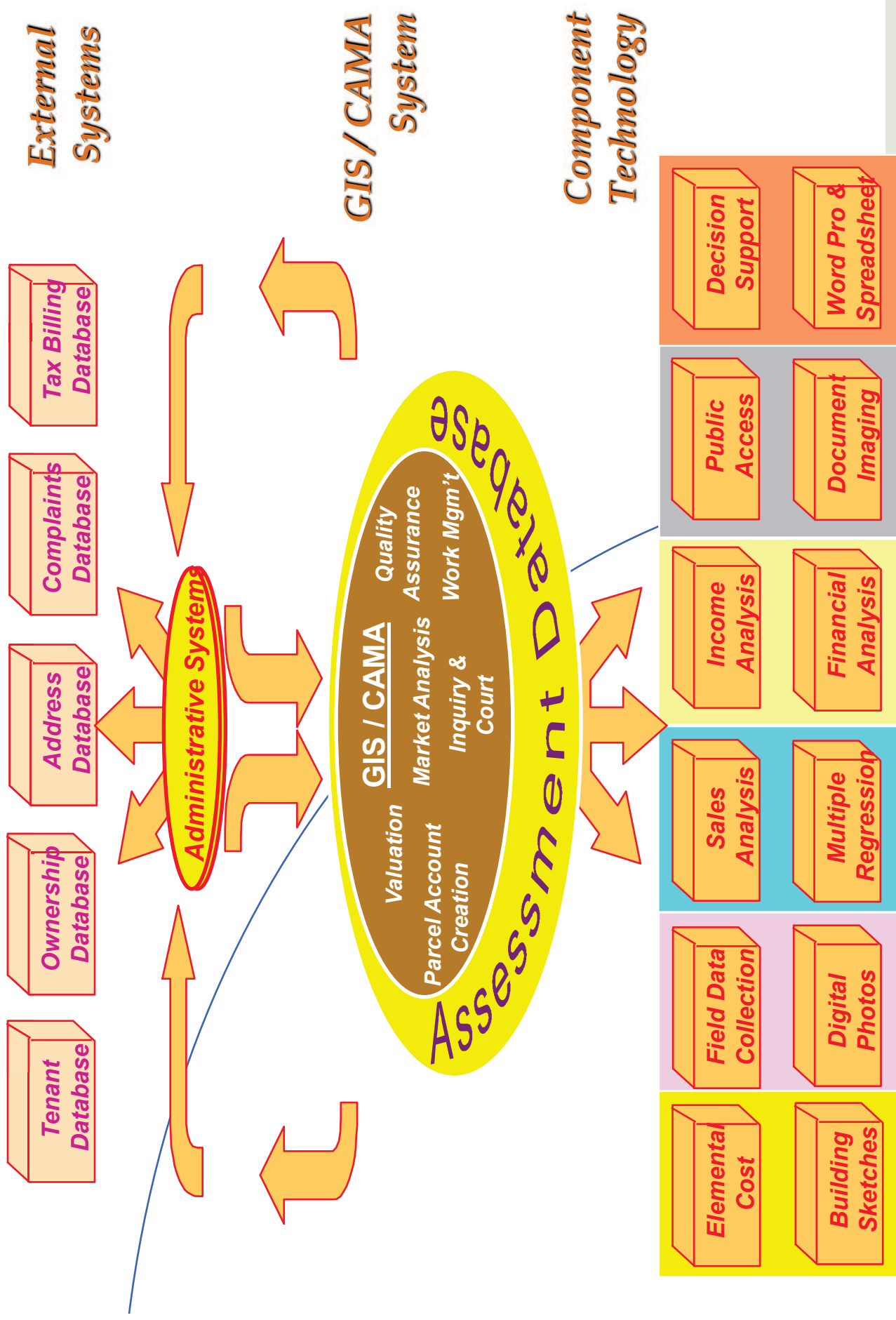
Department of Land & Surveys

Data available

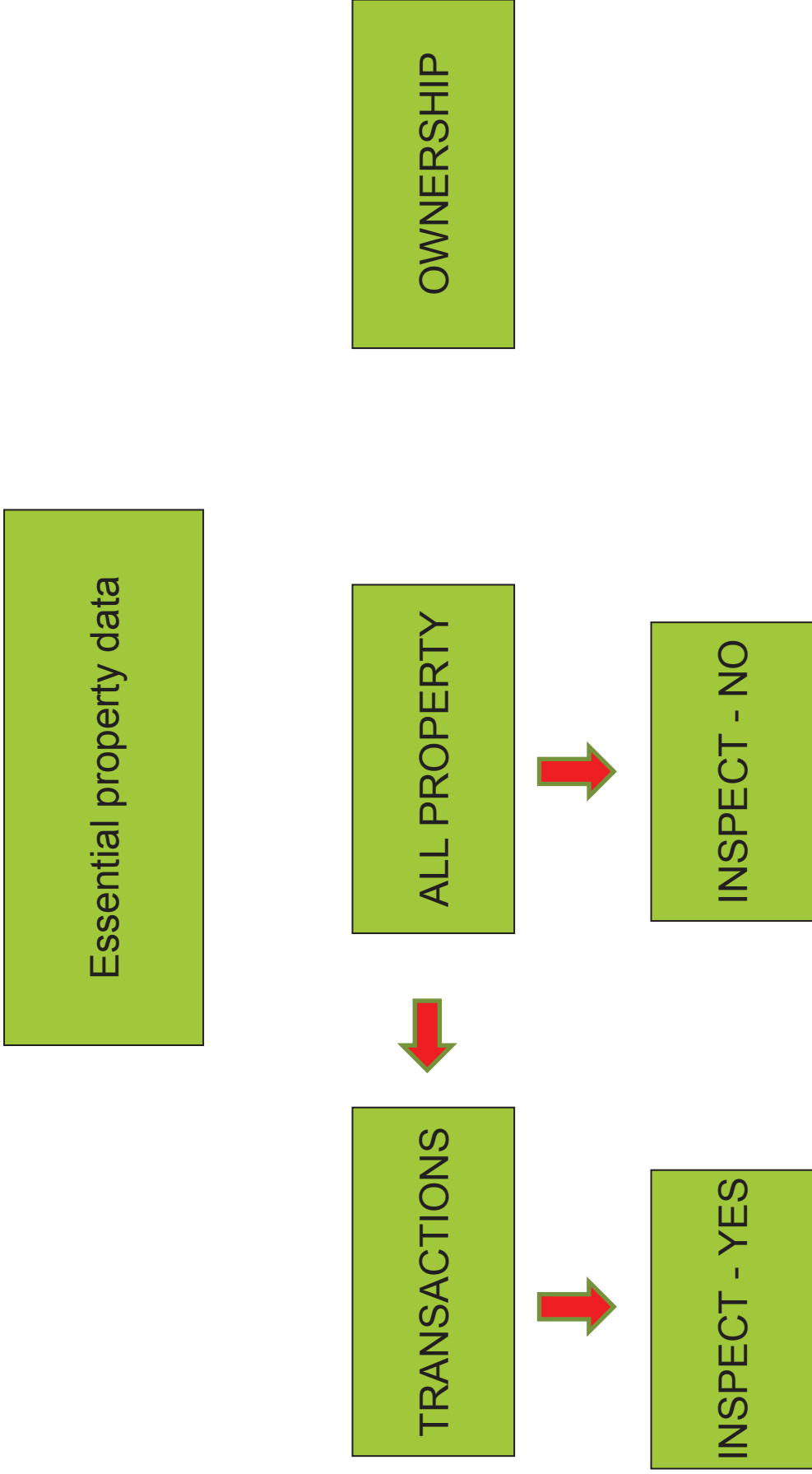


The system is capturing coordinates, boundaries and in some cases alterations in use. Some attributes of the parcels are used for the CAMA system (shape index etc).

GIS / CAMA System



Data Required



PART D

Modelling

Analysis

ANALYSIS / CASE STUDY

NICOSIA AREA (residential only)

- 4261 transactions
- From 2008 since 2014

FLATS - HORIZONTALLY DIVIDED						
Sales from 01.01.2008 to 31.10.2014 (Whole shares only)						
District	Declared price = Accepted price	1%-20% difference	21-30% difference	More than 30% difference	Total	
Nicosia	2.513	391	93	160	3.157	
Limassol	1.367	288	103	146	1.904	
Larnaca	1.147	294	160	243	1.844	
Paphos	690	217	166	302	1.375	
Famagusta	121	71	34	63	289	
					8.569	

Table: declared/accepted sales price difference

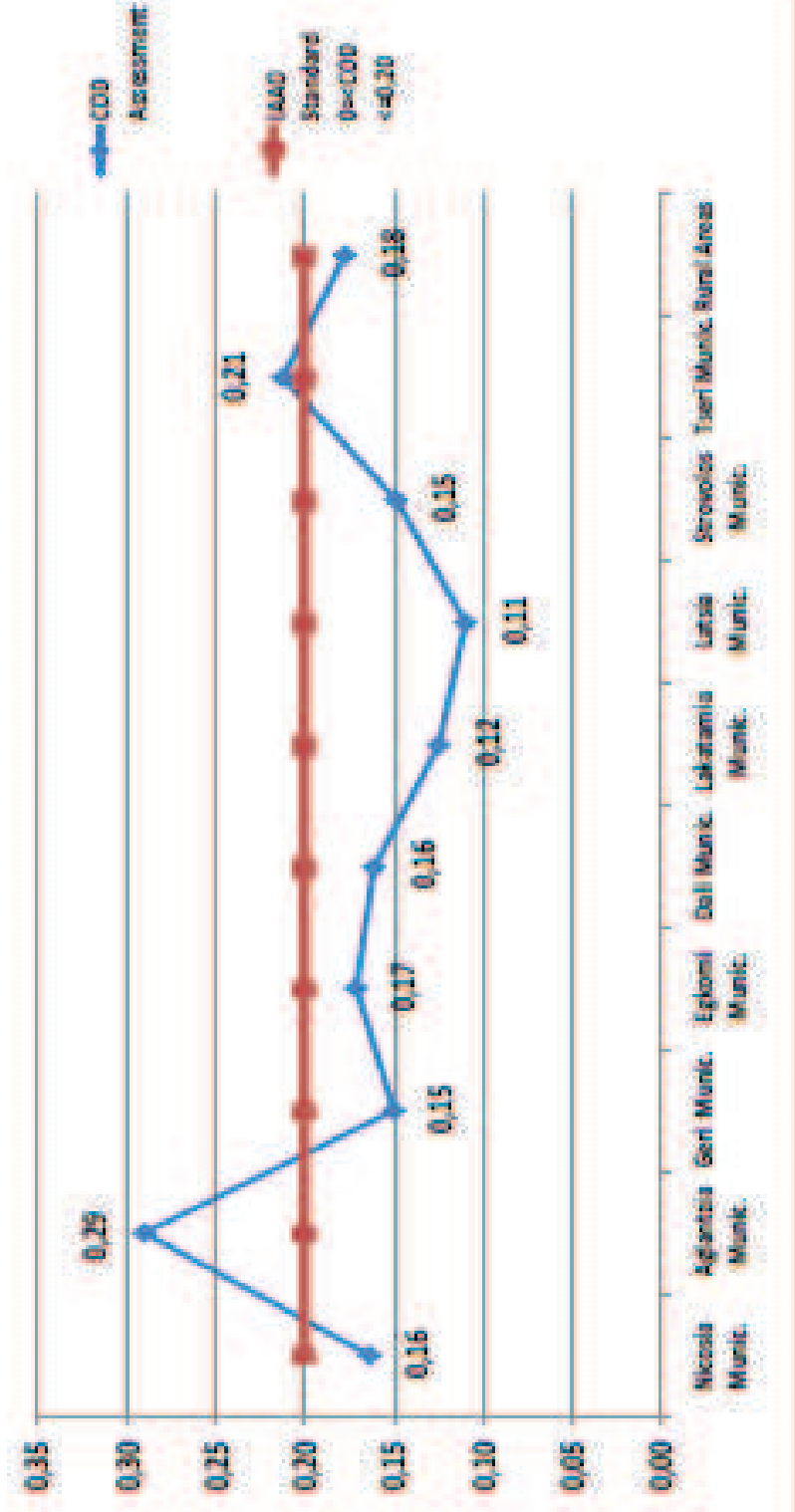
NEW Data obtained

- Enclosed area in square meters;
- Covered area in square meters;
- Uncovered area in square meters;
- Year built;
- Class (luxury, A- very good, B- standard, C below standard, D- very poor);
- Condition (very good, good, fair, bad);
- View (restricted, standard, premium, sea view);
- Planning zone type (17 different types);
- Planning zone density.

RATIO STUDY / COD

IAAO standards

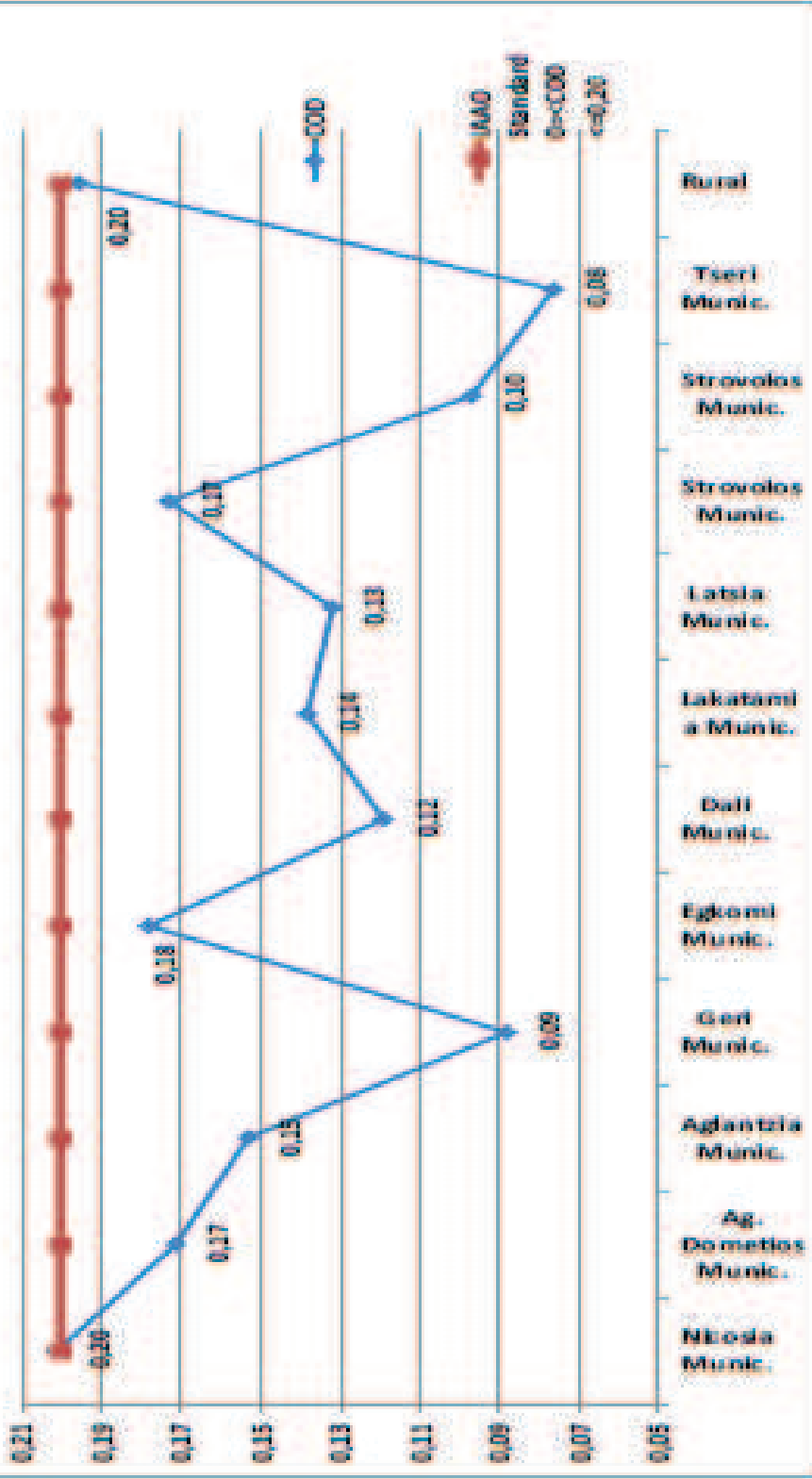
COD INDICATOR - BUILDING SITES IN NICOSIA DISTRICT



Ratio Study / COD

IAAO standards

COD INDICATOR - HDU (Flats) IN NICOSIA DISTRICT



Multiple Correlation matrix

	Parcel Extent	Road Code	Planning Zone density	sales Date	Unit_class_code	Unit_condit ion_code	Unit_view_code	Unit_built_year	Unit_extenc ed_extent	adjusted covered verandahs	Declared Price	Accepted Price	Total_Value_2013
Parcel Extent	100,00%												
Road Code	23,05%	100,00%											
Planning Zone density	13,13%	4,75%	100,00%										
sales Date	-7,68%	-1,17%	-22,52%	100,00%									
Unit_class_code	-4,42%	-4,56%	13,86%	-8,03%	100,00%								
Unit_condit ion_code	9,74%	1,37%	33,41%	-30,02%	28,77%	100,00%							
Unit_view_code	0,83%	7,84%	-0,72%	2,79%	1,90%	-6,18%	100,00%						
Unit_built_year	-13,96%	-4,92%	-51,03%	47,16%	-31,66%	-70,01%	-3,08%	100,00%					
Unit_extenc ed_extent	11,52%	4,66%	21,82%	-15,57%	2,55%	22,63%	20,44%	-30,38%	100,00%				
adjusted covered verandahs	-3,06%	3,29%	-4,04%	10,77%	-7,54%	-12,73%	15,34%	19,99%	46,75%	100,00%			
Declared Price	-2,31%	2,47%	-2,87%	6,29%	-10,90%	-16,91%	15,63%	24,78%	61,27%	57,66%	100,00%		
Accepted Price	-1,91%	3,00%	-2,23%	8,06%	-11,04%	-16,66%	16,74%	24,01%	64,85%	60,97%	98,12%	100,00%	
Total_Value_2013	5,23%	7,91%	25,77%	-4,31%	-7,17%	4,16%	17,08%	-2,23%	77,60%	53,04%	67,92%	71,01%	100,00%

MRA Y = accepted price (0,81)

ΕΞΟΔΟΣ ΣΥΜΠΕΡΑΣΜΑΤΟΣ

Στατιστικά παλινδρόμησης	
Πολλαπλό R	0,817316761
R Τετράγωνο	0,668006687
Προσαρμοσμένο R Τετράγωνο	0,667062451
Τυπικό σφάλμα	0,577007408
Μέγεθος δείγματος	3527

ΑΝΑΛΥΣΗ ΔΙΑΚΥΜΑΝΣΗΣ

	βαθμιοί ελευθερίας	SS	MS	F	μαντικότητα F
Παλινδρόμηση	10	2355,391578	235,5391578	707,4575	0
Υπόλοιπο	3516	1170,608422	0,332937549		
Σύνολο	3526	3526			

	Συντελεστές	Τυπικό σφάλμα	t	τιμή-p	πρώτερο 95.ηλότερο	95.πώτερο 95.ηλότερο
Τεταγμένη επί την αρχή	-5,20683E-15	0,009715802	-5,35913E-13	1	-0,01905	0,019049
Parcel Extent	-0,040959896	0,010173919	-4,025970468	5,79E-05	-0,06091	-0,02101
Road Code	0,019820405	0,010038061	1,974525242	0,0484	0,000139	0,039501
Planning Zone density	0,064714967	0,011394484	5,679499726	1,46E-08	0,042374	0,087055
sales Date	-0,038833435	0,011091878	-3,501069447	0,000469	-0,06058	-0,01709
Unit_class_code	0,020121148	0,010422132	1,930617279	0,053611	-0,00031	0,040555
Unit_condition_code	-0,014991102	0,013823812	-1,084440521	0,278244	-0,04209	0,012112
Unit_view_code	0,011016103	0,01008817	1,091982291	0,274916	-0,00876	0,030795
Unit_built_year	0,443804743	0,017272061	25,69495022	1,4E-133	0,40994	0,477669
Unit_enclosed_extent	0,668918648	0,012616434	53,01962872	0	0,644182	0,693655
adjusted covered verandahs	0,211022682	0,012097636	17,44329847	2,04E-65	0,187304	0,234742

MRA Y = declared (0,78)

ΕΞΟΔΟΣ ΣΥΜΠΕΡΑΣΜΑΤΟΣ

Στατιστικά παλινδρόμησης	
Πολυπλό R	0,784675747
R Τετράγωνο	0,615716028
Προσαρμοσμένο R Τετράγωνο	0,61462307
Τυπικό σφάλμα	0,620787347
Μέγεθος δείγματος	3527

ΑΝΑΛΥΣΗ ΔΙΑΚΥΜΑΝΣΗΣ

	βαθμοί ελευθερίας	SS	MS	F	Σημαντικότητα F
Παλινδρόμηση	10	2171,014713	217,1014713	563,348385	0
Υπόλοιπο	3516	1354,985287	0,38537693		
Σύνολο	3526	3526			

	Συντελεστές	Τυπικό σφάλμα	t	τιμή-P	Κατώτερο 95%	Υψηλότερο 95%	Κατώτερο 95.0% Ψηλότερο 95.0%
Τεταγμένη επί την αρχή	-1,01306E-14	0,01045298	-9,69157E-13	1	-0,02049452	0,02049452	0,02049452
Parcel Extent	-0,041762193	0,010945856	-3,815342784	0,000138332	-0,063223064	-0,020301322	-0,063223064
Road Code	0,017571319	0,010799691	1,627020624	0,103822324	-0,003602974	0,038745613	-0,003602974
Planning Zone density	0,066413604	0,01225903	5,417525105	6,44887E-08	0,042378072	0,090449136	0,042378072
sales Date	-0,066855641	0,011933465	-5,602366419	2,27689E-08	-0,090252857	-0,043458426	-0,090252857
Unit_class_code	0,023546067	0,011212902	2,099908317	0,035807988	0,001561614	0,04553052	0,001561614
Unit_condition_code	-0,007034105	0,014872682	-0,472954737	0,63627483	-0,036194063	0,022125853	-0,036194063
Unit_view_code	0,010368556	0,010853601	0,955310217	0,339486517	-0,010911437	0,031648549	-0,010911437
Unit_built_year	0,469147979	0,018582564	25,24667698	2,1691E-129	0,432714282	0,505581677	0,432714282
Unit_enclosed_extent	0,644932178	0,013573695	47,51338338	0	0,618319063	0,671545293	0,618319063
adjusted covered verandahs	0,188619569	0,013015534	14,49188079	2,8663E-46	0,163100806	0,214138332	0,163100806

MRA Y = TAX 2013 (0,84)

ΕΞΟΔΟΣ ΣΥΜΠΕΡΑΣΜΑΤΟΣ

Στατιστικά παλινδρόμησης	
Πολυπλό R	0,847499
R Τετράγωνο	0,718254
Προσαρμοσμένο R Τετράγωνο	0,717453
Τυπικό σφάλμα	0,531552
Μέγεθος δείγματος	3527

Multicollinearity

ΑΝΑΛΥΣΗ ΔΙΑΚΥΜΑΝΣΗΣ

	βαθμοί ελευθει	SS	MS	F	Σημαντικότητα F
Παλινδρόμηση	10	2532,564	253,2564	896,3328	0
Υπόλοιπο	3516	993,4362	0,282547		
Σύνολο	3526	3526			

	Συντελεστές/πικό σφάλμ	t	τιμή-P	Κατώτερο 95%	ηλότερο 95%	ηλότερο 95%
Τεταγμένη επί την αρχή	-1,8E-14	0,00895	-2E-12	1	0,017548518	0,017549
Parcel Extent	-0,0344	0,009372	-3,67047	0,000246	-0,052777192	-0,01603
Road Code	0,050169	0,009247	5,425249	6,18E-08	0,032038216	0,068299
Planning Zone density	0,261815	0,010497	24,94226	1,4E-126	0,241234543	0,282396
sales Date	-0,03899	0,010218	-3,81566	0,000138	-0,059022676	-0,01895
Unit_class_code	-0,0206	0,009601	-2,14546	0,031984	-0,039423041	-0,00177
Unit_condition_code	0,048571	0,012735	3,814028	0,000139	0,023602533	0,073539
Unit_view_code	0,011868	0,009293	1,277082	0,201658	-0,006352597	0,03009
Unit_built_year	0,36023	0,015911	22,63977	4,7E-106	0,329033793	0,391427
Unit_enclosed_extent	0,754594	0,011623	64,92506	0	0,731806089	0,777381
adjusted covered verandahs	0,120459	0,011145	10,8087	8,22E-27	0,098608162	0,142309
					0,098608	0,142309

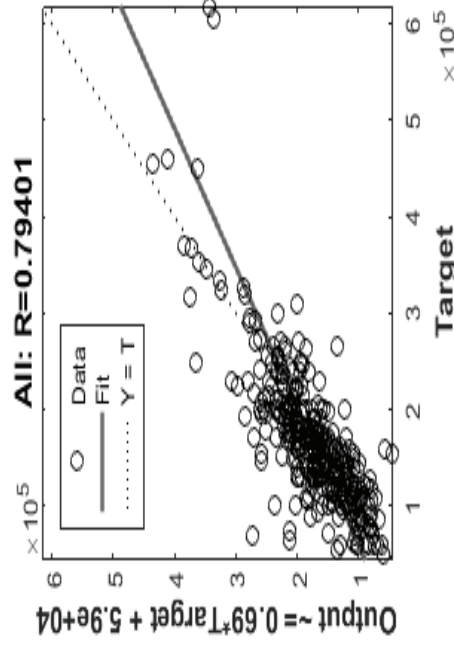
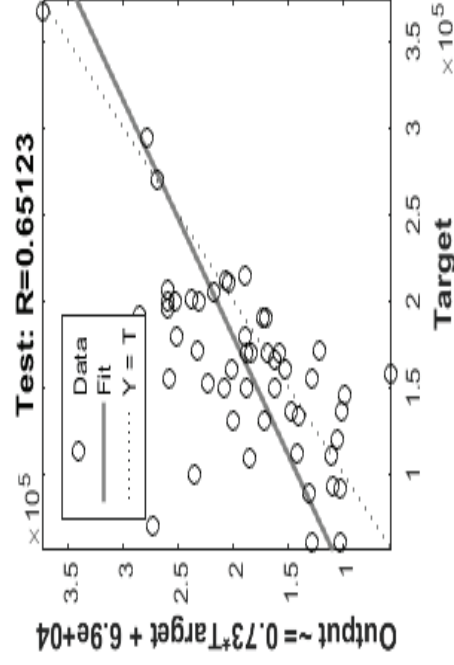
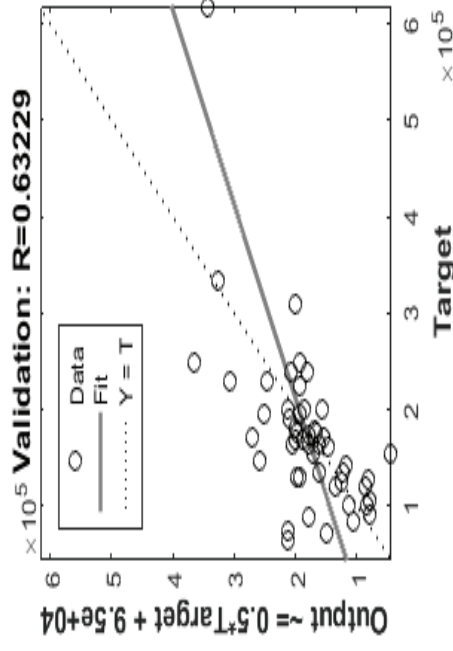
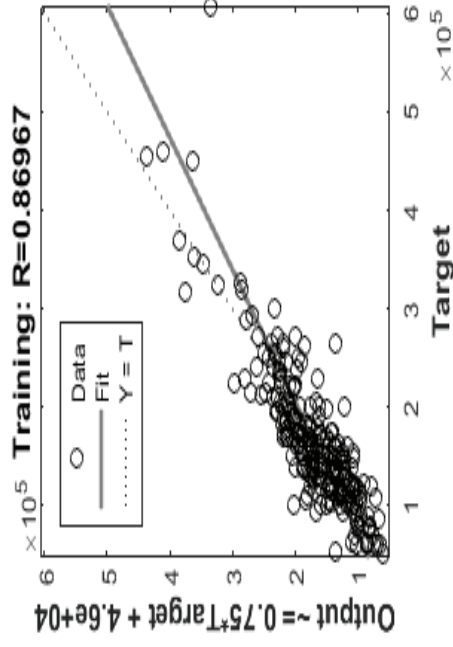
ANN

The 'black box'

- ❑ Back propagation that updates weight and bias values according to Levenberg-Marquardt optimization.
- ❑ The architecture of the network contained 10 hidden neurons and 15% of values were used for a validation set at the training procedure, and another 15% for a final test set.

ANN (0,86)

Predictors and Accepted



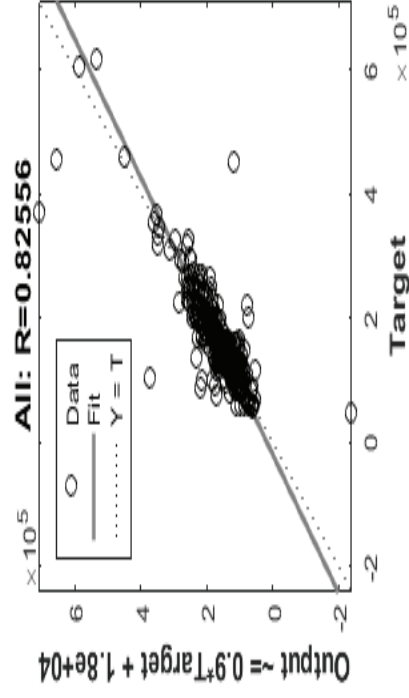
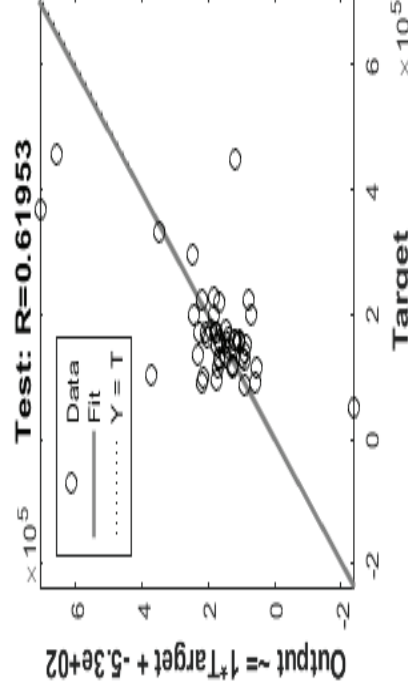
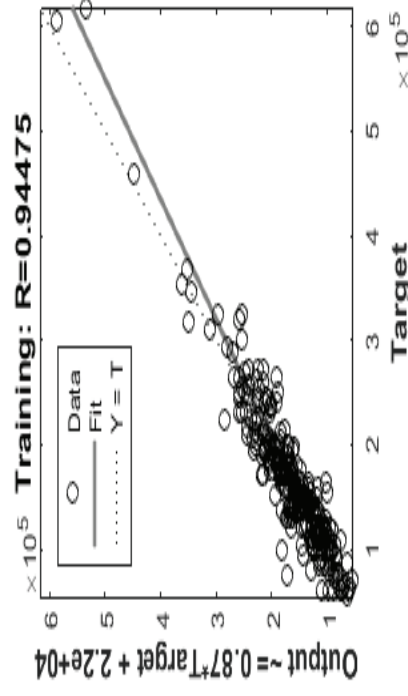
ANN (0,94)

Bayesian regularization

- A training function that minimizes a combination of squared errors and weights, so as to determine the optimum combination for a network that generalizes well.
- The process is called **Bayesian regularization**, and is very important as the basic inefficiency of neural networks is that many times, they over-fit data and does not model (fit) well with the main trend.

ANN (0,94)

Amazing Results



PART E

Conclusions

Tax Payer's opinion

TAX PAYER'S OPINION (413 responses)

Are you informed about the results of the NGV regarding your properties?

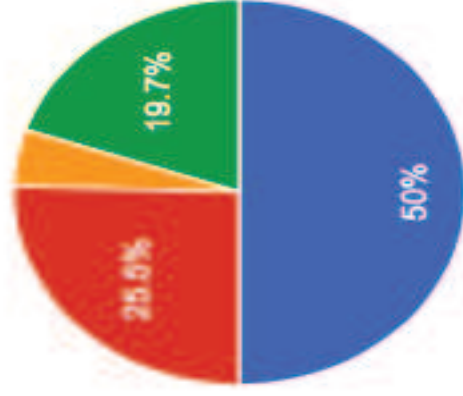
7.Ενημερωθήκατε για τα αποτελέσματα της γενικής εκτίμησης σε τιμές 1.1.13 για το ακίνητό σας;

Ναι	296	76.7%
Όχι	90	23.3%



TAX PAYER'S OPINION (413 responses)

8. Εάν ναι, με ποιο τρόπο ενημερωθήκατε;

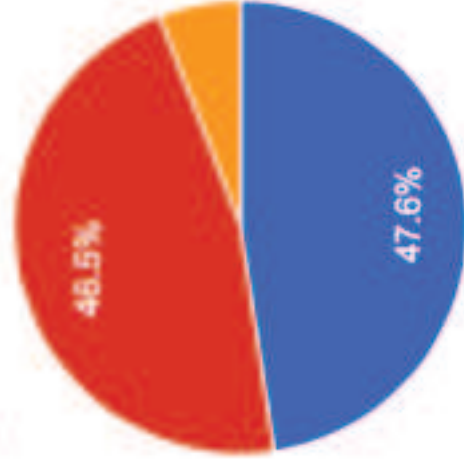


SOURCE OF
INFORMATION

Ιστοσελίδα κτηματολογίου	157	50%
Επίσκεψη σε επαρχιακά γραφεία Κτηματολογίου	80	25.5%
Ενημέρωση από το τηλεφωνικό κέντρο	15	4.8%
Άλλο	62	19.7%

TAX PAYER'S OPINION (413 responses)

**What do you believe about the
NGV? (fair = blue= 47,6%)**

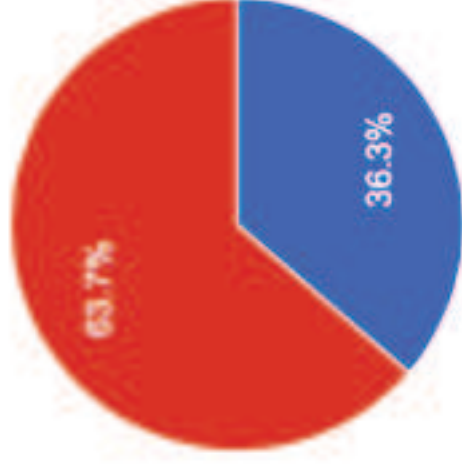


Δικαιολογημένη	170	47.6%
Αδικοιολόγητα Ψηλή	166	46.5%
Αδικοιολόγητα Χαμηλή	21	5.9%

TAX PAYER'S OPINION (413 responses)

Do you know the Amount of Property Tax for the next year?

10. Γνωρίζετε το ποσό που θα κληθείτε να πληρώσετε ως φόρο ακίνητης ιδιοκτησίας τον επόμενο χρόνο;



Response	Count	Percentage
Ναι	141	36.3%
Όχι	247	63.7%

TAX PAYER'S OPINION (413 responses)

**From scale 1 to 10
evaluate the DLS**

14. Αν θέλατε εκτίμηση του ακινήτου σας για οποιοδήποτε σκοπό, θα βασίζοσασταν στα αποτελέσματα της Νέας Γενικής Εκτίμησης;

