

Supplementary Materials

An Assessment Methodology for the Evaluation of the Impacts of the COVID-19 Pandemic on the Italian Housing Market Demand

Francesco Tajani ^{1,*}, Felicia Di Liddo ², Maria Rosaria Guarini ¹, Rossana Ranieri ¹ and Debora Anelli ²

¹ Department of Architecture and Design, Sapienza University of Rome, Via Flaminia 359, 00196 Rome, Italy; mariarosaria.guarini@uniroma1.it (M.R.G.); rossana.ranieri@uniroma1.it (R.R.)

² Department of Civil, Environmental, Land, Building Engineering and Chemistry (DICATECh), Polytechnic University of Bari, Via Orabona 4, 70125 Bari, Italy; felicia.diliddo@poliba.it (F.D.L.); debora.anelli@poliba.it (D.A.)

* Correspondence: francesco.tajani@uniroma1.it

Citation: Tajani, F.; Di Liddo, F.; Guarini, M.R.; Ranieri, R.; Anelli, D. An Assessment Methodology for the Evaluation of the Impacts of the COVID-19 Pandemic on the Italian Housing Market Demand. *Buildings* **2021**, *11*, 592. <https://doi.org/10.3390/buildings11120592>

Academic Editor: Dirk H. R. Spennemann

Received: 25 October 2021

Accepted: 24 November 2021

Published: 28 November 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

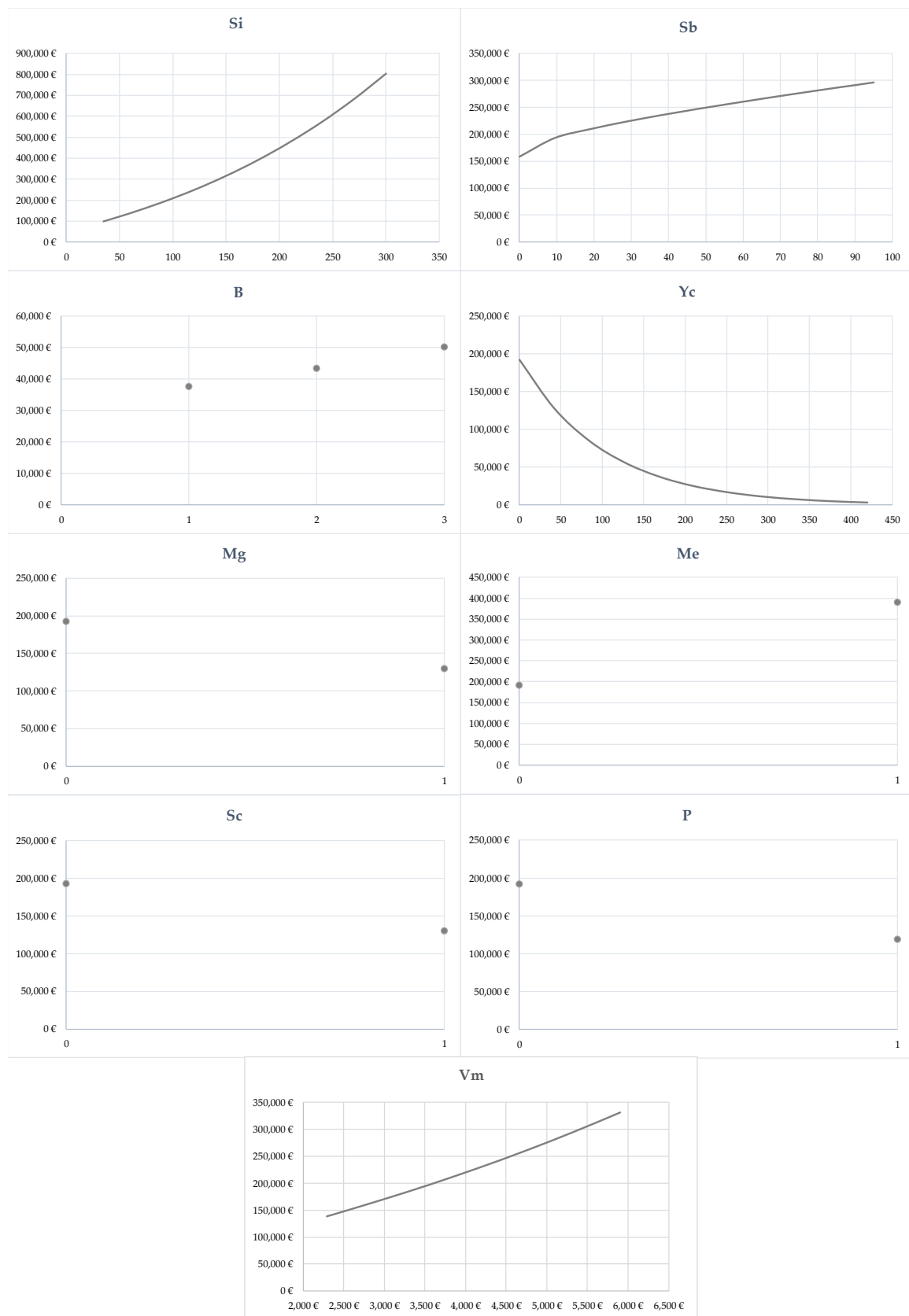


Figure S1. Functional relationships between property prices and explanatory variables selected by the model for the city of Turin in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

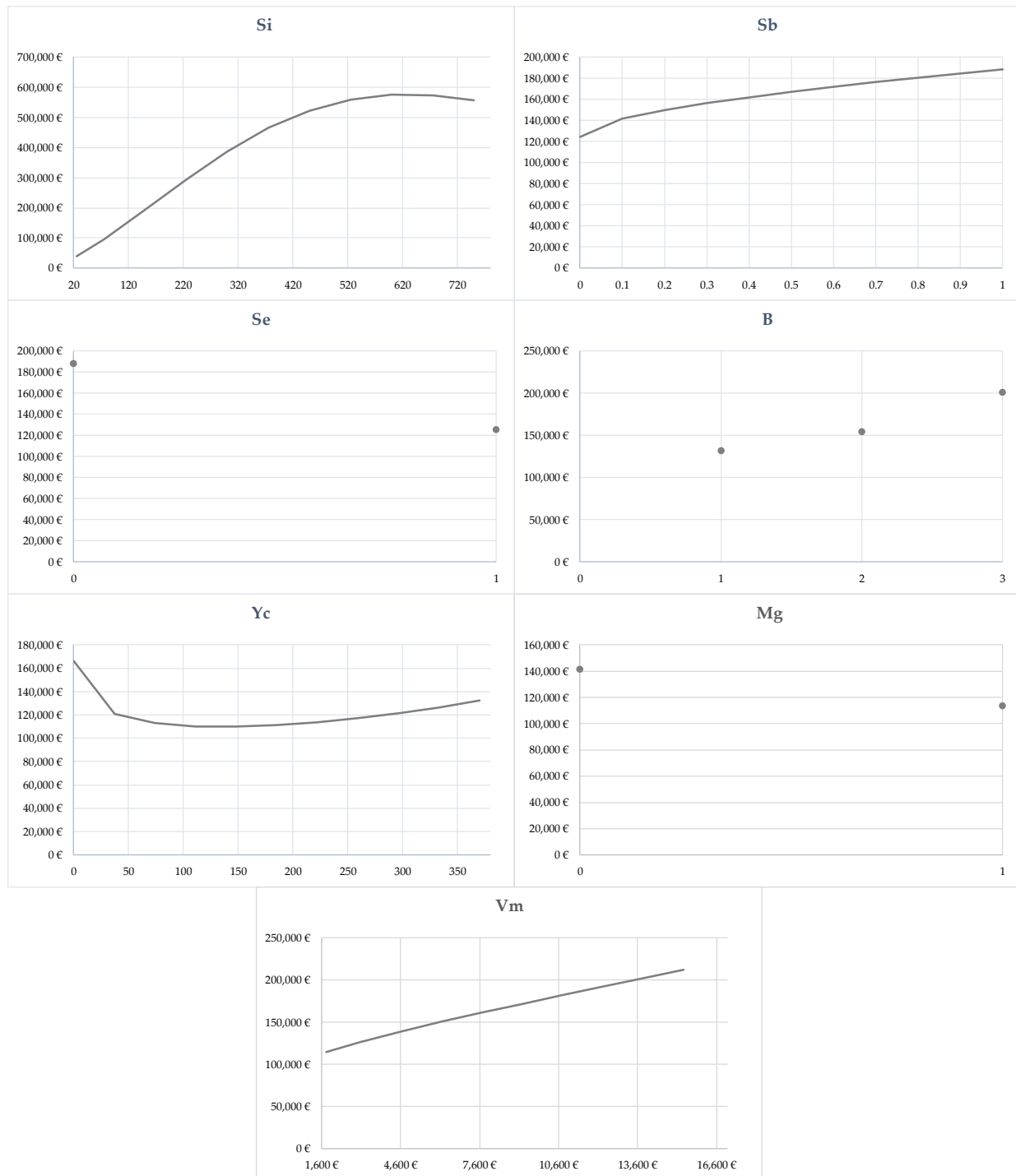


Figure S2. Functional relationships between property prices and explanatory variables selected by the model for the city of Milan in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

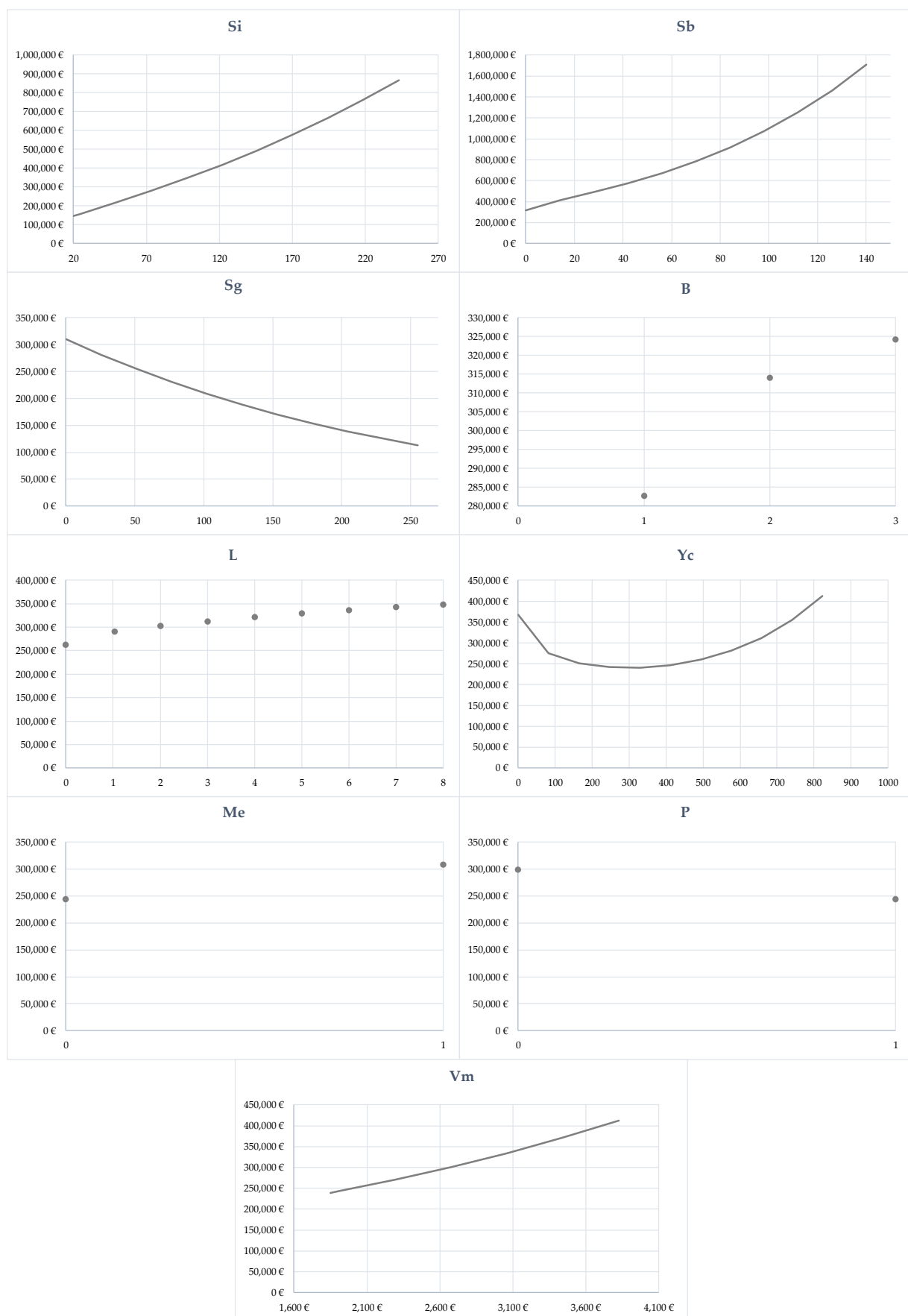


Figure S3. Functional relationships between property prices and explanatory variables selected by the model for the city of Florence in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

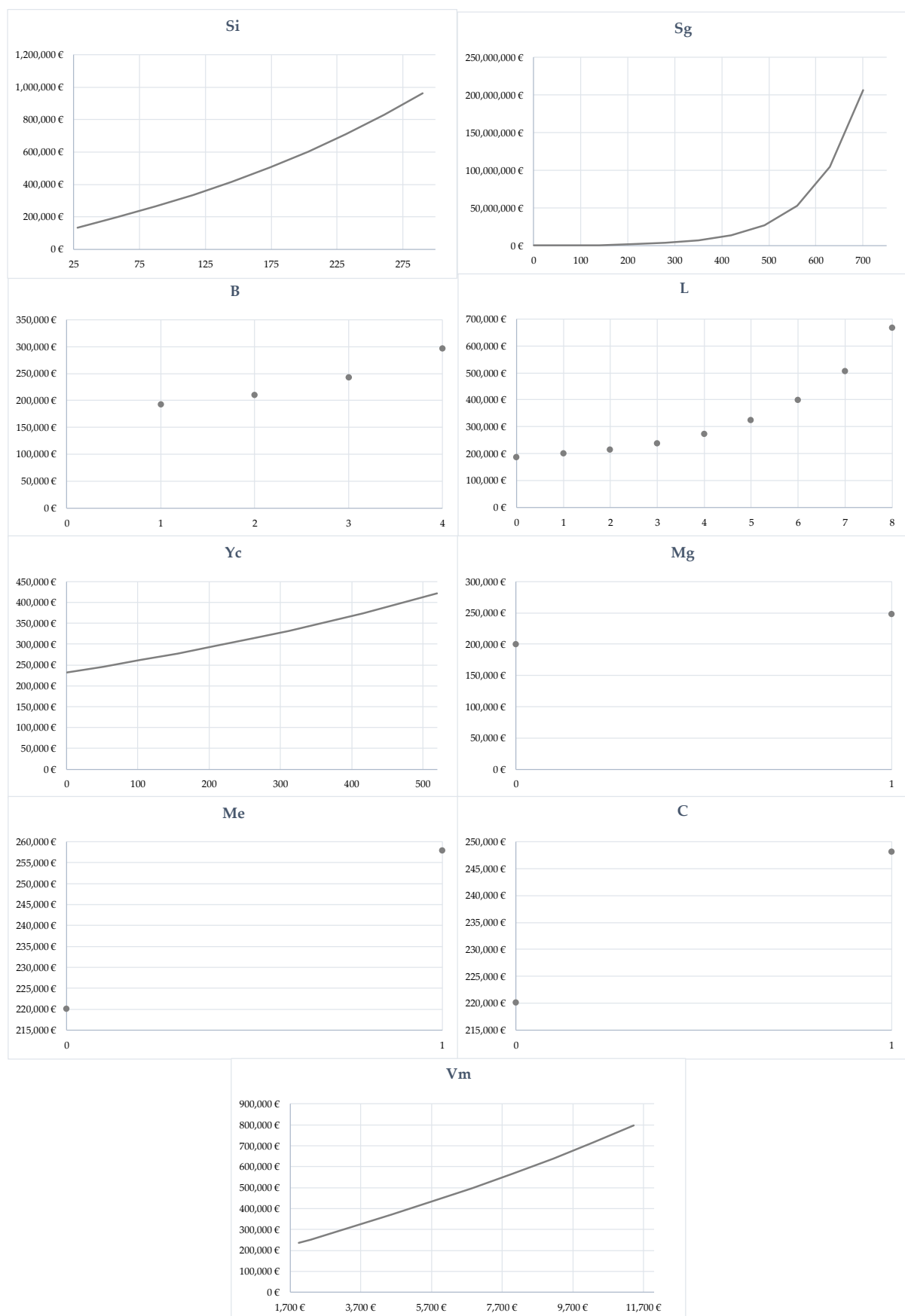


Figure S4. Functional relationships between property prices and explanatory variables selected by the model for the city of Rome in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

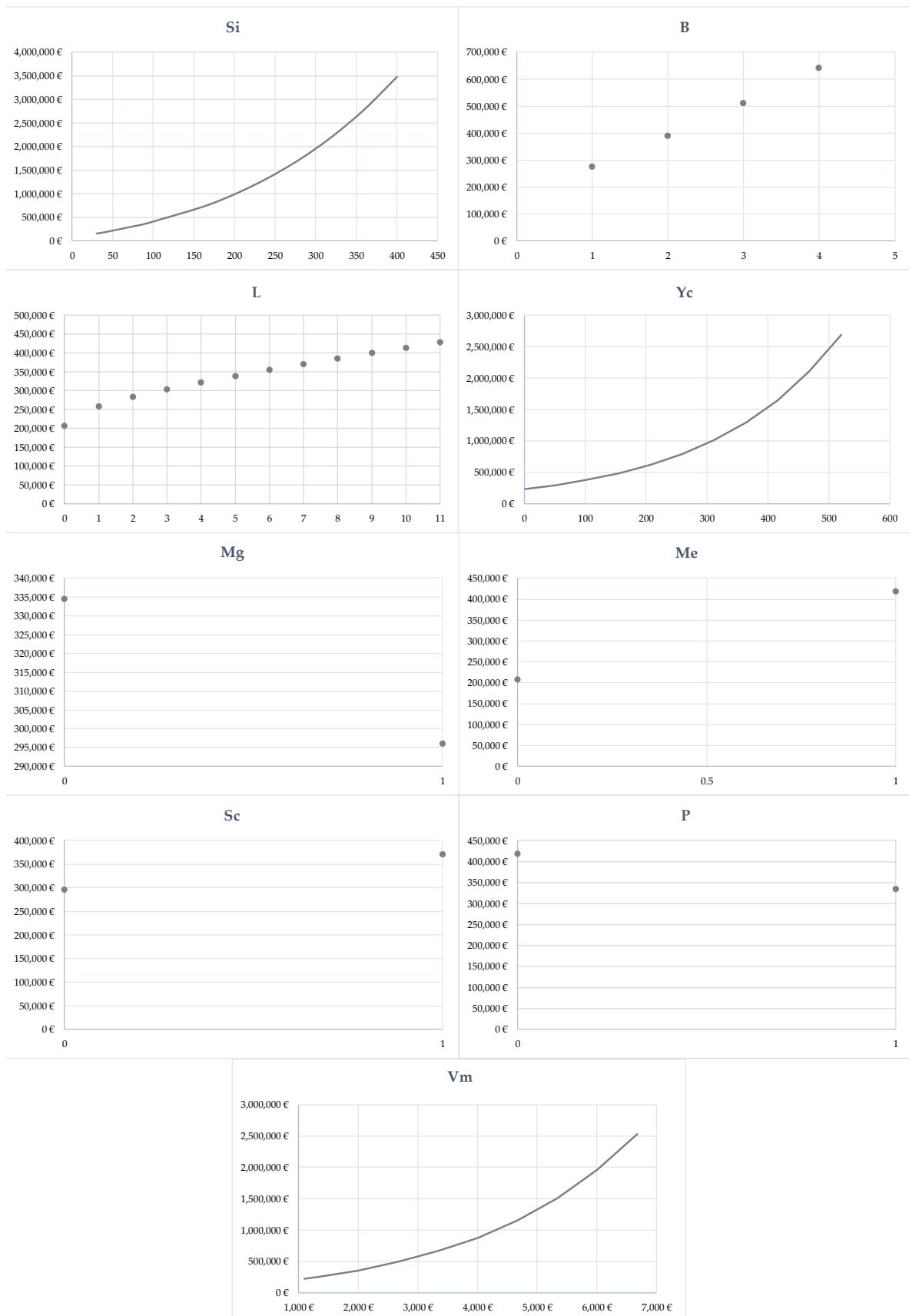


Figure S5. Functional relationships between property prices and explanatory variables selected by the model for the city of Naples in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

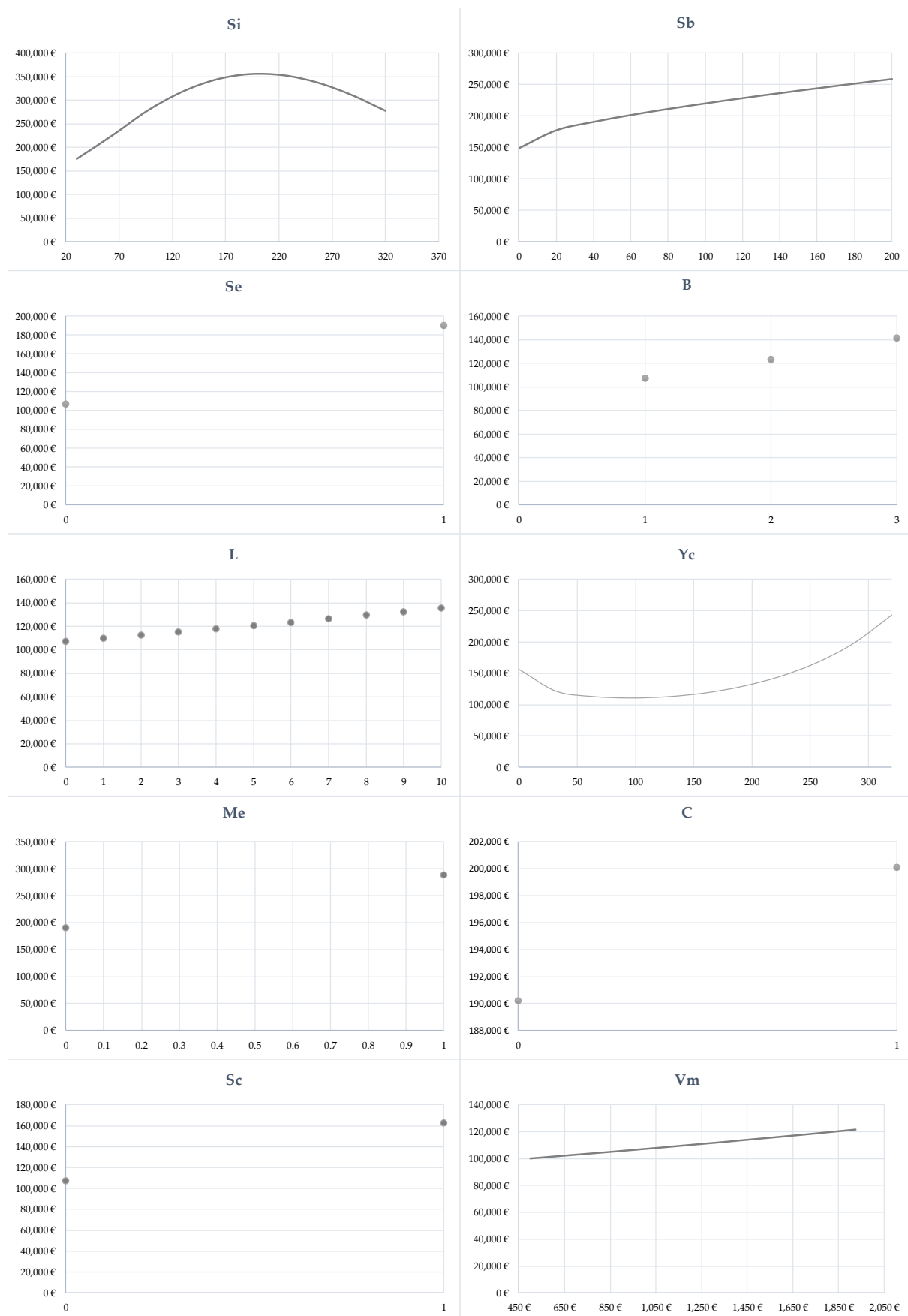


Figure S6. Functional relationships between property prices and explanatory variables selected by the model for the city of Catania in the Phase I (II semester 2019—“ante COVID-19 pandemic”).

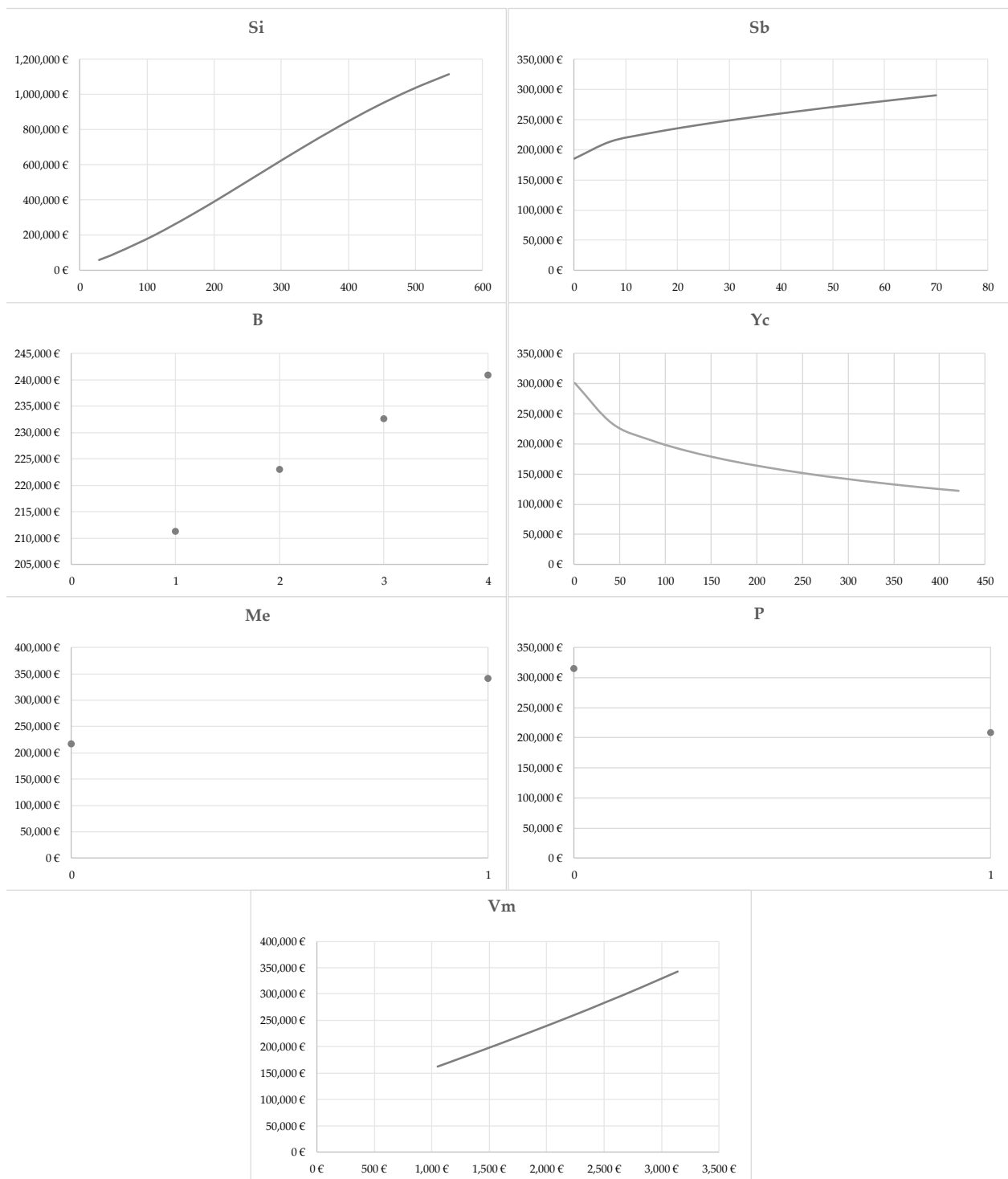


Figure S7. Functional relationships between property prices and explanatory variables selected by the model for the city of Turin in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

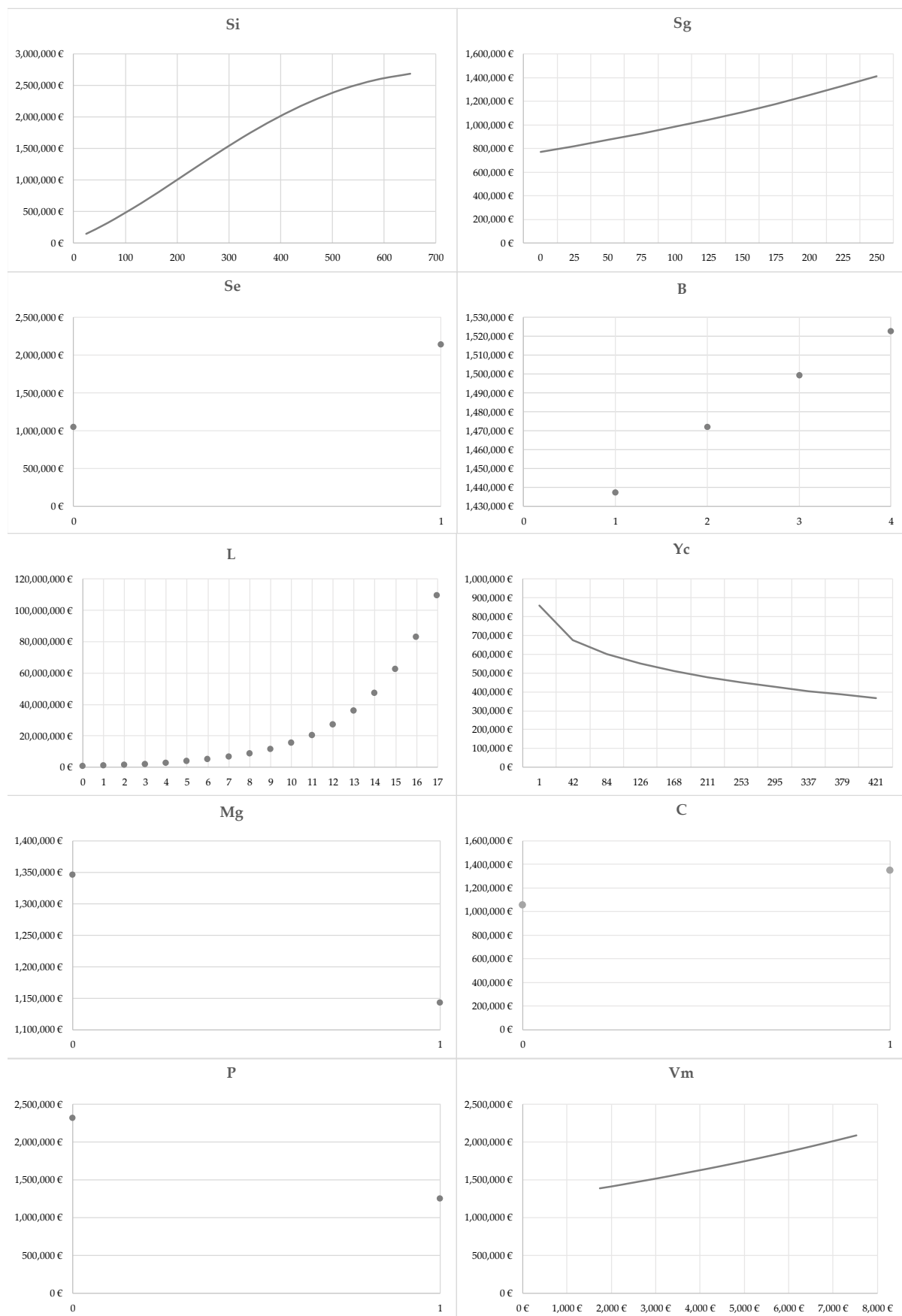


Figure S8. Functional relationships between property prices and explanatory variables selected by the model for the city of Milan in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

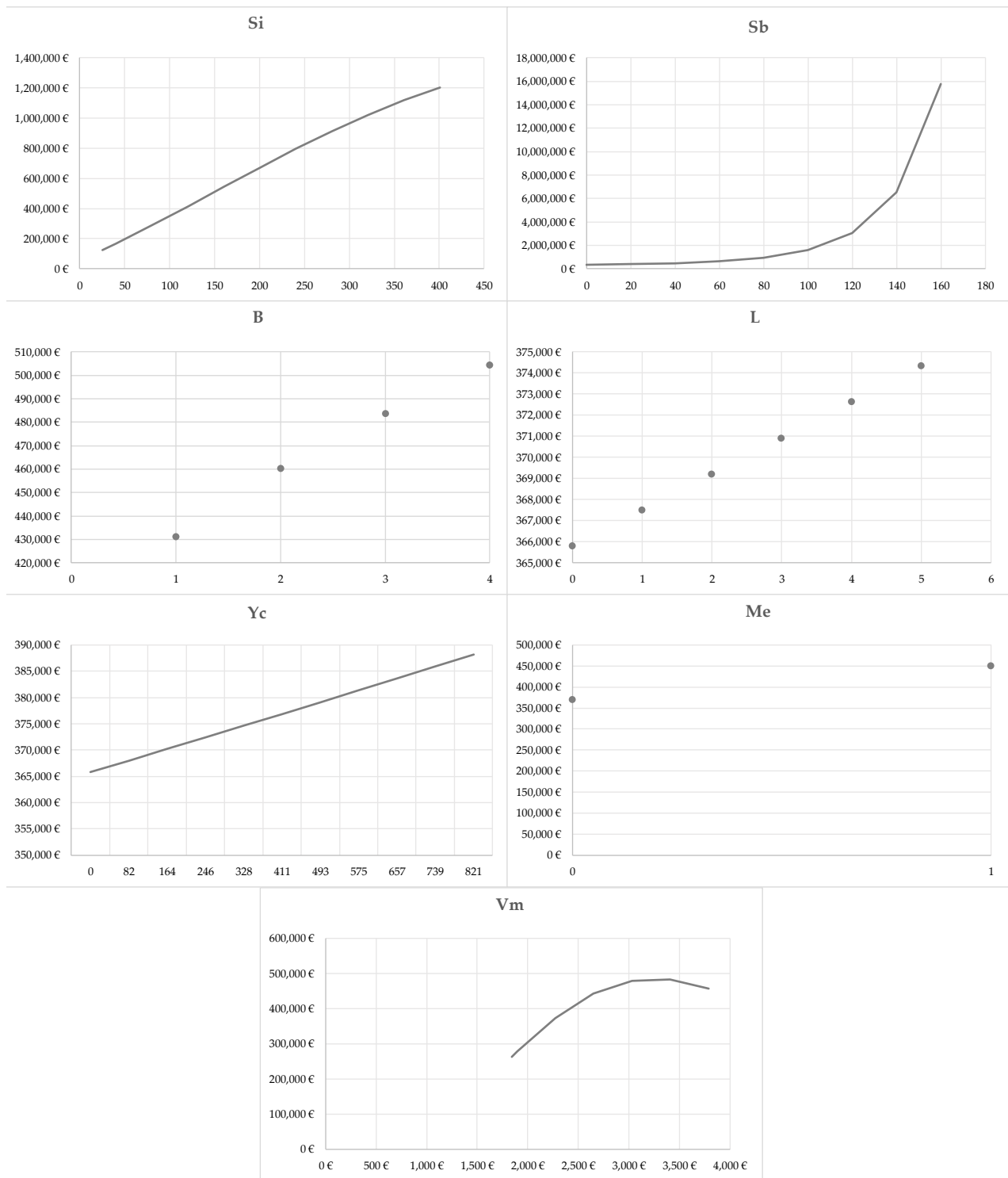


Figure S9. Functional relationships between property prices and explanatory variables selected by the model for the city of Florence in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

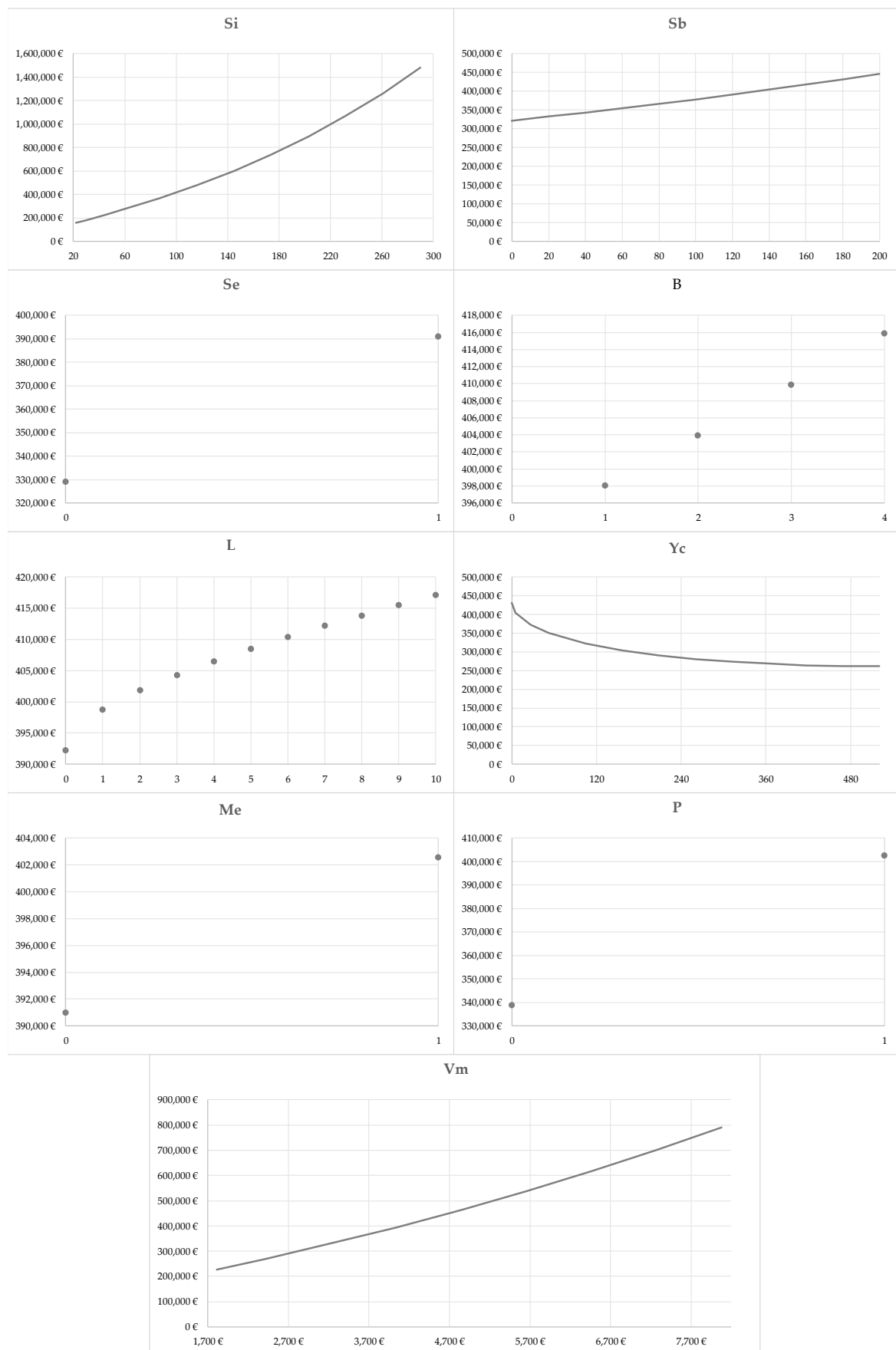


Figure S10. Functional relationships between property prices and explanatory variables selected by the model for the city of Rome in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

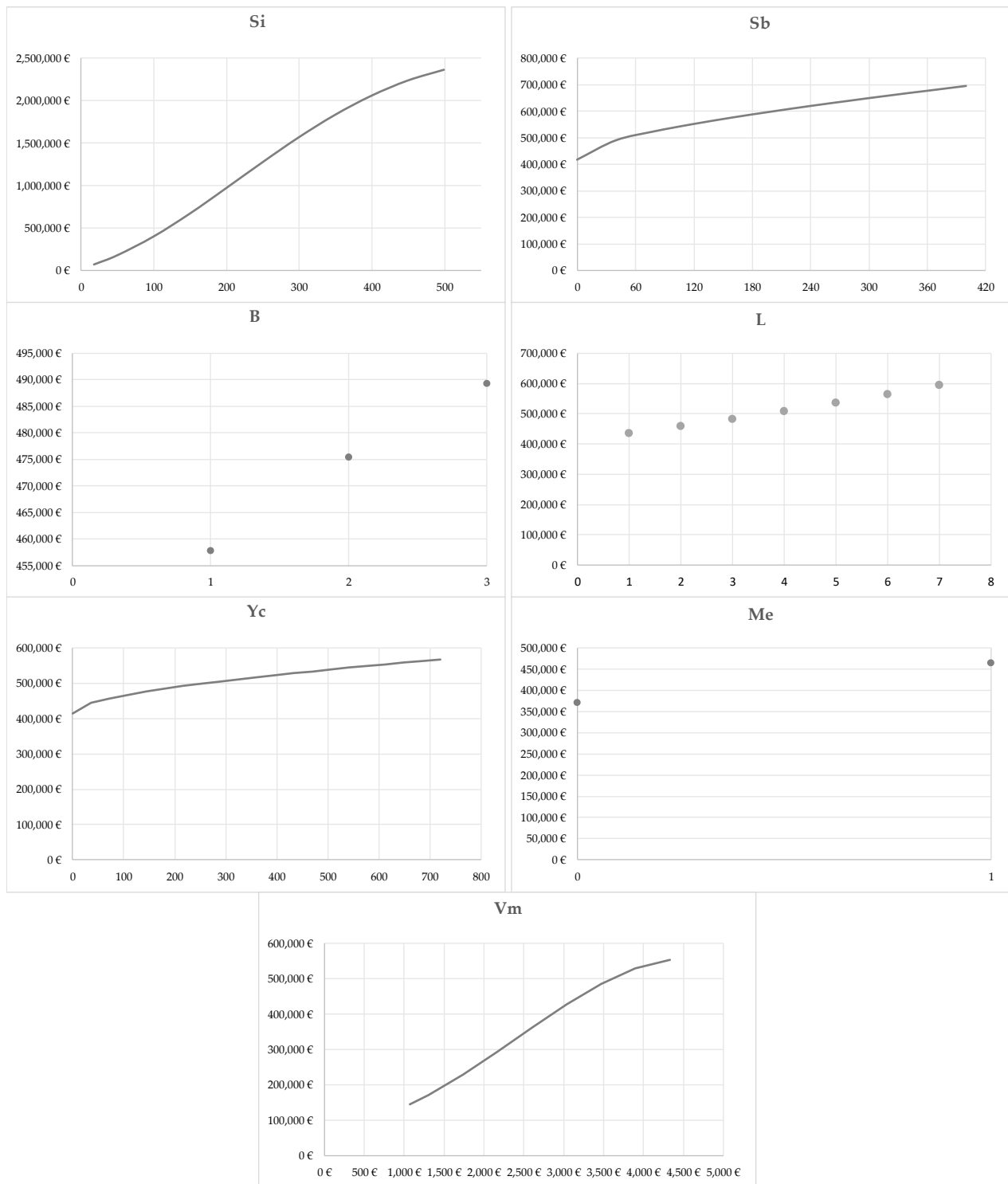


Figure S11. Functional relationships between property prices and explanatory variables selected by the model for the city of Naples in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

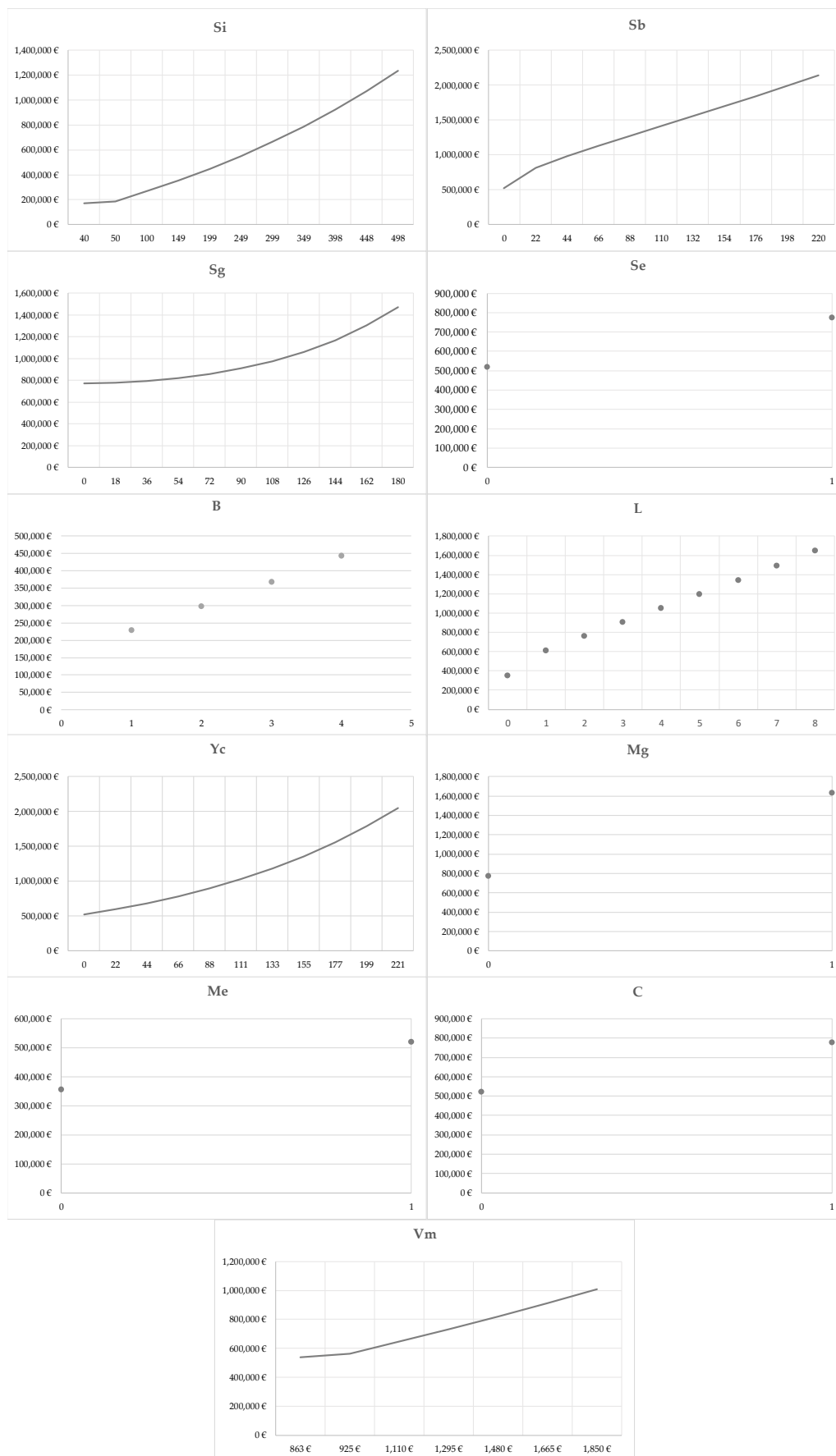


Figure S12. Functional relationships between property prices and explanatory variables selected by the model for the city of Catania in the Phase II (I semester 2021 – “COVID-19 pandemic in progress”).

Table S1. Descriptive statistics of the variables for the city of Turin related to the Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	214,945.46	246,990.01	<100,000	0.35
			100,001–250,000	0.45
			250,001–450,000	0.11
			450,001–999,999	0.07
			>1,000,000	0.02
OMI quotation (€/m ²)	3449.27	1014.50	<2000	0.00
			2001–3500	0.62
			3501–5000	0.26
			>5001	0.12
Internal surface (m ²)	88.10	43.59	<60	0.30
			61–90	0.35
			91–140	0.25
			141–180	0.06
			>181	0.04
Surface of private garden (m ²)	2.42	15.86	<50	0.98
			51–100	0.01
			>100	0.01
Surface of balconies or terraces (m ²)	8.89	14.44	<6	0.65
			7–15	0.23
			16–30	0.07
			31–80	0.04
			>81	0.01
Presence of condominium areas (1—presence. 0—absence)	0.14	0.35	0	0.86
			1	0.14
Floor level (n.)	2.65	2.19	<2	0.53
			3–5	0.38
			6–9	0.08
			>10	0.01
Number of bathrooms (n.)	1.33	0.57	1	0.72
			2	0.23
			>3	0.05
Building construction year (n.)	1946	71.44	<1850	0.05
			1851–1950	0.28
			1951–1980	0.43
			1981–2008	0.10
			2008–2020	0.14
Municipal trade area			Central	0.13
			Semi-central	0.37
			Peripheral	0.46
			Suburban	0.04
Property maintenance conditions			Bad	0.25
			Good	0.46
			Excellent	0.29

Table S2. Descriptive statistics of the variables for the city of Milan—Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	606,233.55	859,381.65	<100,000	0.01
			100,001–250,000	0.25
			250,001–450,000	0.32
			450,001–999,999	0.29
			>1,000,000	0.13
OMI quotation (€/m ²)	4869.17	3632.76	<2000	0.09
			2001–3500	0.39
			3501–5000	0.29
			>5001	0.23
Internal surface (m ²)	97.43	70.96	<60	0.25
			61–90	0.33
			91–140	0.29
			141–180	0.05
			>181	0.08
Surface of private garden (m ²)	4.60	32.13	<50	0.97
			51–100	0.02
			>100	0.01
Surface of balconies or terraces (m ²)	9.46	18.07	<6	0.67
			7–15	0.18
			16–30	0.07
			31–80	0.07
			>81	0.01
Presence of condominium areas (1—presence. 0—absence)	0.41	0.49	0	0.59
			1	0.41
Floor level (n.)	2.17	2.58	<2	0.65
			3–5	0.24
			6–9	0.10
			>10	0.01
Number of bathrooms (n.)	1.53	0.66	1	0.56
			2	0.35
			>3	0.09
Building construction year (n.)	1953	47.01	<1850	0.02
			1851–1950	0.41
			1951–1980	0.36
			1981–2008	0.09
			2009–2020	0.12
Municipal trade area			Central	0.20
			Semi-central	0.29
			Peripheral	0.41
			Suburban	0.10
Property maintenance conditions			Bad	0.37
			Good	0.37
			Excellent	0.26

Table S3. Descriptive statistics of the variables for the city of Florence—Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequene (%)
Total selling price (€)	337,636.36	205,144.87	<100,000	0.01
			100,001–250,000	0.37
			250,001–450,000	0.48
			450,001–999,999	0.12
			>1,000,000	0.02
OMI quotation (€/m ²)	2661.82	464.89	<2000	0.02
			2001–3500	0.93
			3501–5000	0.05
			>5001	0.00
Internal surface (m ²)	80.52	35.66	<60	0.30
			61–90	0.42
			91–140	0.21
			141–180	0.04
			>181	0.03
Surface of private garden (m ²)	9.73	34.09	<50	0.93
			51–100	0.04
			>101	0.03
Surface of balconies or terraces (m ²)	7.07	16.02	<6	0.74
			7–15	0.15
			16–30	0.05
			31–80	0.05
			>81	0.01
Presence of condominium areas (1—presence. 0—absence)	0.08	0.27	0	0.92
			1	0.08
Floor level (n.)	1.73	1.75	<2	0.79
			3–5	0.17
			6–9	0.04
			>10	0.00
Number of bathrooms (n.)	1.41	0.61	1	0.66
			2	0.27
			>3	0.07
Building construction year (n.)	1899	142.42	<1850	0.18
			1851–1950	0.42
			1951–1980	0.22
			1981–2008	0.03
			2008–2020	0.15
Municipal trade area			Central	0.24
			Semi-central	0.48
			Peripheral	0.26
			Suburban	0.02
Property maintenance conditions			Bad	0.10
			Good	0.38
			Excellent	0.52

Table S4. Descriptive statistics of the variables for the city of Rome—Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	375,947.85	321,513.30	<100,000	0.02
			100,001–250,000	0.39
			250,001–450,000	0.39
			450,001–999,999	0.14
			>1,000,000	0.06
OMI quotation (€/m ²)	4203.48	1757.27	<2000	0.01
			2001–3500	0.45
			3501–5000	0.29
			>5001	0.25
Internal surface (m ²)	98.02	44.73	<60	0.20
			61–90	0.33
			91–140	0.34
			141–180	0.08
			>181	0.05
Surface of private garden (m ²)		58.28	0.00	0.85
			1–20	0.06
			21–50	0.05
			51–99	0.03
			>100	0.01
Surface of balconies or terraces (m ²)		18.96	<6	0.50
			7–15	0.26
			16–30	0.15
			31–80	0.08
			>81	0.01
Presence of condominium areas (1—presence. 0—absence)	0.37	0.49	0	0.63
			1	0.37
Floor level (n.)	0.29	0.25	<2	0.60
			3–5	0.32
			6–9	0.08
			>10	0.00
Number of bathrooms (n.)	1.54	0.66	1	0.54
			2	0.39
			>3	0.07
Building construction year (n.)	1961	55.79	<1850	0.03
			1851–1950	0.20
			1951–1980	0.52
			1981–2008	0.15
			2008–2020	0.10
Municipal trade area			Central	0.12
			Semi-central	0.24
			Peripheral	0.29
			Suburban	0.35
Property maintenance conditions			Bad	0.32
			Good	0.37
			Excellent	0.31

Table S5. Descriptive statistics of the variables for the city of Naples—Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	304,980.89	298,529.42	<100,000	0.16
			100,001–250,000	0.46
			250,001–450,000	0.16
			450,001–999,999	0.18
			>1,000,000	0.04
OMI quotation (€/m ²)	2334.06	976.45	<2000	0.50
			2001–3500	0.40
			3501–5000	0.09
			>5001	0.01
Internal surface (m ²)	102.56	50.48	<60	0.18
			61–90	0.30
			91–140	0.35
			141–180	0.11
			>180	0.06
Surface of private garden (m ²)	2.56	18.89	<50	0.98
			51–100	0.01
			>100	0.01
Surface of balconies or terraces (m ²)	12.33	24.52	<6	0.58
			7–15	0.26
			16–30	0.06
			31–80	0.06
			>81	0.04
Presence of condominium areas (1—presence. 0—absence)	0.20	0.40	0	0.80
			1	0.20
Floor level (n.)	2.62	2.19	<2	0.58
			3–5	0.33
			6–9	0.08
			>10	0.01
Number of bathrooms (n.)	1.52	0.66	1	0.56
			2	0.38
			>3	0.06
Building construction year (n.)	1944	55.72	<1850	0.04
			1851–1950	0.27
			1951–1980	0.62
			1981–2008	0.04
			2008–2020	0.03
Municipal trade area			Central	0.32
			Semi-central	0.26
			Peripheral	0.16
			Suburban	0.26
Property maintenance conditions			Bad	0.15
			Good	0.54
			Excellent	0.31

Table S6. Descriptive statistics of the variables for the city of Catania—Phase I.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	145,012.12	91,982.50	<100,000	0.40
			100,001–250,000	0.49
			250,001–450,000	0.10
			450,001–999,999	0.01
			>1,000,000	0.00
OMI quotation (€/m ²)	1011.36	386.32	<700	0.25
			701–1000	0.44
			1001–2000	0.31
			2001–3500	0.00
			3501–5000	0.00
			>5001	0.00
Internal surface (m ²)	95.19	35.82	<60	0.15
			61–90	0.39
			91–140	0.36
			141–180	0.08
			>181	0.02
Surface of private garden (m ²)		8.78	<15	0.96
			16–50	0.03
			51–100	0.01
			>100	0.00
Surface of balconies or terraces (m ²)	12.66	20.73	<6	0.45
			7–15	0.34
			16–30	0.16
			31–80	0.03
			>81	0.02
Presence of condominium areas (1—presence. 0—absence)	0.14	0.35	0	0.86
			1	0.14
Floor level (n.)	2.15	2.01	<2	0.64
			3–5	0.28
			6–9	0.07
			>10	0.01
Number of bathrooms (n.)	1.48	0.56	1	0.55
			2	0.42
			>3	0.03
Building construction year (n.)	1959	43.68	<1850	0.04
			1851–1950	0.31
			1951–1980	0.46
			1981–2008	0.13
			2009–2020	0.06
Municipal trade area			Central	0.33
			Semi-central	0.31
			Peripheral	0.25
			Suburban	0.11
Property maintenance conditions			Bad	0.25
			Good	0.46
			Excellent	0.29

Table S7. Descriptive statistics of the variables for the city of Turin—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	289,095.45	305,534.48	<100,000	0.19
			100,001–250,000	0.50
			250,001–450,000	0.15
			450,001–999,999	0.11
			>1,000,000	0.05
OMI quotation (€/m ²)	1735.87	558.46	<2000	0.73
			2001–3500	0.26
			3501–5000	0.01
			>5001	0.00
Internal surface (m ²)	115.21	73.53	<60	0.13
			61–90	0.35
			91–140	0.33
			141–180	0.07
			>181	0.12
Surface of private garden (m ²)	2.24	10.38	<50	0.97
			51–100	0.01
			>100	0.02
Surface of balconies or terraces (m ²)	8.85	12.73	<6	0.58
			7–15	0.24
			16–30	0.13
			31–80	0.05
			>81	0.00
Presence of condominium areas (1—presence. 0—absence)	0.32	0.35	0	0.68
			1	0.32
Floor level (n.)	2.65	2.04	0	0.14
			<2	0.41
			3–5	0.38
			6–9	0.07
			>10	0.00
Number of bathrooms (n.)	1.47	0.73	1	0.65
			2	0.24
			>3	0.11
Building construction year (n.)	1942	60.27	<1850	0.08
			1851–1950	0.27
			1951–1980	0.53
			1981–2008	0.06
			2008–2020	0.06
Municipal trade area			Central	0.20
			Semi-central	0.29
			Peripheral	0.51
			Suburban	0.00
Property maintenance conditions			Bad	0.16
			Good	0.47
			Excellent	0.37

Table S8. Descriptive statistics of the variables for the city of Milan—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequene (%)
Total selling price (€)	1,350,957.58	1,287,886.80	<100,000	0.00
			100,001–250,000	0.04
			250,001–450,000	0.21
			450,001–999,999	0.35
			>1,000,000	0.40
OMI quotation (€/m ²)	3710.45	1489.88	<2.000	0.02
			2.001–3.500	0.65
			3.501–5.000	0.20
			>5.001	0.13
Internal surface (m ²)	159.05	115.40	<60	0.20
			61–90	0.15
			91–140	0.24
			141–180	0.06
			>181	0.35
Surface of private garden (m ²)	7.68	27.74	1 <50	0.96
			51–100	0.03
			>100	0.01
Surface of balconies or terraces (m ²)	10.51	22.54	<6	0.68
			7–15	0.15
			16–30	0.08
			31–80	0.07
			>81	0.02
Presence of condominium areas (1—presence. 0—absence)	0.39	49.00	0	0.61
			1	0.39
Floor level (n.)	2.79	2.79	<2	0.56
			3–5	0.32
			6–9	0.08
			>10	0.04
Number of bathrooms (n.)	2.04	1.40	1	0.38
			2	0.31
			>3	0.31
Building construction year (n.)	1946	56.37	<1850	0.05
			1851–1950	0.44
			1951–1980	0.35
			1981–2008	0.01
			2009–2020	0.15
Municipal trade area			Central	0.34
			Semi-central	0.54
			Peripheral	0.11
			Suburban	0.01
Property maintenance conditions			Bad	0.14
			Good	0.24
			Excellent	0.62

Table S9. Descriptive statistics of the variables for the city of Florence—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequenze (%)
Total selling price (€)	476,903.03	517.844.03	<100,000	0.01
			100,001–250,000	0.37
			250,001–450,000	0.48
			450,001–999,999	0.12
			>1,000,000	0.02
OMI quotation (€/m ²)	2699.02	475.19	<2000	0.02
			2001–3500	0.93
			3501–5000	0.05
			>5001	0.00
Internal surface (m ²)	105.69	68.24	< 60	0.30
			61–90	0.42
			91–140	0.21
			141–180	0.04
			>181	0.03
Surface of private garden (m ²)	4.10	34.09	<50	0.93
			51–100	0.04
			>101	0.03
Surface of balconies or terraces (m ²)	8.87	19.84	<6	0.53
			7–15	0.28
			16–30	0.08
			31–80	0.04
			>81	0.07
Presence of condominium areas (1—presence. 0—absence)	0.20	0.40	0	0.80
			1	0.20
Floor level (n.)	1.73	1.75	<2	0.72
			3–5	0.28
			6–9	0.00
			>10	0.00
Number of bathrooms (n.)	1.41	0.61	1	0.59
			2	0.27
			>3	0.14
Building construction year (n.)	1899	142.42	<1850	0.13
			1851–1950	0.34
			1951–1980	0.38
			1981–2008	0.07
			2008–2020	0.08
Municipal trade area			Central	0.29
			Semi-central	0.48
			Peripheral	0.22
			Suburban	0.01
Property maintenance conditions			Bad	0.06
			Good	0.29
			Excellent	0.65

Table S10. Descriptive statistics of the variables for the city of Rome—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	406,654.55	321,513.30	<100,000	0.01
			100,001–250,000	0.34
			250,001–450,000	0.38
			450,001–999,999	0.23
			>1,000,000	0.04
OMI quotation (€/m ²)	3212.55	1588.59	<2000	0.03
			2001–3500	0.70
			3501–5000	0.10
			>5001	0.14
Internal surface (m ²)	96.54	45.06	<60	0.18
			61–90	0.42
			91–140	0.25
			141–180	0.10
			>181	0.05
Surface of private garden (m ²)	12.61	42.00	0.00	0.88
			1–20	0.00
			21–50	0.02
			51–99	0.06
			>100	0.04
Surface of balconies or terraces (m ²)	14.03	22.95	<6	0.44
			7–15	0.30
			16–30	0.18
			31–80	0.06
			>81	0.02
Presence of condominium areas (1—presence. 0—absence)	0.19	0.40	0	0.80
			1	0.20
Floor level (n.)	2.28	1.87	<2	0.62
			3–5	0.32
			6–9	0.05
			>10	0.01
Number of bathrooms (n.)	0.67		1	0.52
			2	0.40
			>3	0.08
Building construction year (n.)	1950	98.39	<1850	0.07
			1851–1950	0.13
			1951–1980	0.49
			1981–2008	0.08
			2008–2020	0.23
Municipal trade area			Central	0.07
			Semi-central	0.27
			Peripheral	0.46
			Suburban	0.20
Property maintenance conditions			Bad	0.08
			Good	0.34
			Excellent	0.58

Table S11. Descriptive statistics of the variables for the city of Naples—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	514,472.12	691,755.73	<100,000	0.12
			100,001–250,000	0.38
			250,001–450,000	0.19
			450,001–999,999	0.20
			>1,000,000	0.11
OMI quotation (€/m ²)	2667.38	1048.30	<2000	0.42
			2.001–3.500	0.31
			3.501–5.000	0.27
			>5.001	0.00
Internal surface (m ²)	112.21	74.39	<60	0.19
			61–90	0.33
			91–140	0.27
			141–180	0.11
			>180	0.10
Surface of private garden (m ²)	10.98	61.07	<50	0.96
			51–100	0.01
			>100	0.03
Surface of balconies or terraces (m ²)	17.49	45.38	<6	0.49
			7–15	0.35
			16–30	0.06
			31–80	0.06
			>81	0.04
Presence of condominium areas (1—presence. 0—absence)	0.13	0.00	0	0.87
			1	0.13
Floor level (n.)	2.25	1.71	<2	0.60
			3–5	0.36
			6–9	0.04
			>10	0.00
Number of bathrooms (n.)	1.38	0.53	1	0.65
			2	0.33
			>3	0.02
Building construction year (n.)	1924	82.24	<1850	0.11
			1851–1950	0.42
			1951–1980	0.44
			1981–2008	0.01
			2008–2020	0.02
Municipal trade area			Central	0.42
			Semi-central	0.33
			Peripheral	0.16
			Suburban	0.09
Property maintenance conditions			Bad	0.42
			Good	0.18
			Excellent	0.40

Table S12. Descriptive statistics of the variables for the city of Catania—Phase II.

Variable	Mean	Standard Deviation	Levels/Intervals	Frequency (%)
Total selling price (€)	269,254.55	179,970.41	<100,000	0.12
			100,001–250,000	0.41
			250,001–450,000	0.10
			450,001–999,999	0.36
			>1,000,000	0.01
OMI quotation (€/m ²)	1390.14	289.37	<700	0.00
			701–1000	0.10
			1001–2000	0.90
			2.001–3.500	0.00
			3.501–5.000	0.00
			>5.001	0.00
Internal surface (m ²)	149.70	67.15	<60	0.04
			61–90	0.13
			91–140	0.41
			141–180	0.15
			>181	0.27
Surface of private garden (m ²)	9.85	31.93	<15	0.87
			16–50	0.06
			51–100	0.03
			>100	0.04
Surface of balconies or terraces (m ²)	20.66	31.99	<6	0.33
			7–15	0.25
			16–30	0.27
			31–80	0.10
			>81	0.05
Presence of condominium areas (1—presence. 0—absence)	0.24	0.43	0	0.76
			1	0.24
Floor level (n.)	1.89	1.84	<2	0.73
			3–5	0.22
			6–9	0.05
			>10	0.00
Number of bathrooms (n.)	4.88	0.77	1	0.34
			2	0.48
			>3	0.18
Building construction year (n.)	1956	37.00	<1850	0.02
			1851–1950	0.24
			1951–1980	0.58
			1981–2008	0.13
			2009–2020	0.03
Municipal trade area			Central	0.33
			Semi-central	0.47
			Peripheral	0.16
			Suburban	0.04
Property maintenance conditions			Bad	0.15
			Good	0.24
			Excellent	0.61

Table S13. Correlation analysis of the variables for the city of Turin—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.27	1.00													
Sg	0.18	−0.03	1.00												
Se	0.00	0.03	0.09	1.00											
L	0.18	0.13	−0.19	−0.10	1.00										
B	0.79	0.32	0.14	0.01	0.15	1.00									
Yc	0.14	−0.10	−0.11	−0.14	−0.14	0.08	1.00								
Mp	0.12	−0.03	0.04	0.01	−0.02	0.13	0.16	1.00							
Mg	−0.12	−0.06	0.04	−0.06	−0.03	−0.09	−0.05	−0.53	1.00						
Me	0.01	0.10	−0.09	0.05	0.05	−0.02	−0.10	−0.37	−0.59	1.00					
C	0.29	−0.07	0.06	−0.15	−0.06	0.19	0.64	0.12	−0.06	−0.04	1.00				
Sc	−0.11	0.08	−0.11	−0.05	−0.11	−0.05	−0.08	0.14	−0.15	0.03	−0.29	1.00			
P	−0.09	−0.03	0.08	0.12	0.18	−0.07	−0.32	−0.17	0.15	0.00	−0.35	−0.71	1.00		
Sub	0.00	0.01	−0.03	0.09	−0.09	−0.02	−0.07	−0.12	0.11	0.00	−0.08	−0.16	−0.19	1.00	
Vm	0.33	0.13	0.04	−0.15	−0.11	0.28	0.49	0.24	−0.18	−0.04	0.73	0.13	−0.56	−0.11	1.00

Table S14. Correlation analysis of the variables for the city of Milan—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.48	1.00													
Sg	0.58	0.21	1.00												
Se	−0.03	0.07	−0.03	1.00											
L	0.31	0.34	0.13	0.09	1.00										
B	0.66	0.32	0.25	−0.08	0.11	1.00									
Yc	0.34	0.10	0.23	−0.03	0.03	0.08	1.00								
Mp	0.00	0.00	−0.05	−0.04	0.01	−0.16	0.08	1.00							
Mg	0.15	0.17	−0.02	0.07	0.08	0.18	0.18	−0.29	1.00						
Me	−0.01	−0.09	0.16	−0.01	0.00	−0.04	−0.13	−0.38	−0.75	1.00					
C	0.11	−0.01	0.06	−0.01	0.00	0.11	0.21	0.00	−0.14	0.17	1.00				
Sc	0.20	0.09	0.09	−0.13	0.00	0.12	0.08	0.01	0.00	0.03	−0.29	1.00			
P	0.02	0.08	−0.02	0.17	0.14	−0.04	0.00	−0.12	0.20	−0.09	−0.39	−0.51	1.00		
Sub	−0.09	−0.04	0.21	0.00	0.00	−0.15	−0.15	0.18	−0.06	−0.06	−0.17	−0.22	−0.28	1.00	
Vm	0.16	0.08	0.14	−0.05	0.04	0.14	0.22	−0.03	−0.12	0.19	0.88	−0.01	−0.47	−0.26	1.00

Table S15. Correlation analysis of the variables for the city of Florence—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.21	1.00													
Sg	0.42	0.03	1.00												
Se	−0.05	−0.06	−0.08	1.00											
L	−0.07	0.19	−0.27	0.02	1.00										
B	0.64	0.16	0.29	−0.12	−0.09	1.00									
Yc	0.17	−0.06	−0.06	0.07	−0.06	0.18	1.00								
Mp	0.05	−0.05	0.04	0.08	−0.01	−0.16	0.05	1.00							
Mg	0.12	0.06	0.01	−0.06	0.01	0.06	0.16	−0.24	1.00						
Me	−0.14	−0.03	−0.03	0.01	−0.01	0.03	−0.19	−0.30	−0.85	1.00					
C	0.13	−0.05	−0.10	−0.11	0.02	0.29	0.36	−0.06	−0.04	0.07	1.00				
Sc	−0.08	0.04	0.09	−0.01	−0.04	−0.17	−0.23	−0.01	0.04	−0.03	−0.55	1.00			
P	−0.04	0.02	−0.04	0.13	0.03	−0.12	−0.07	0.08	0.02	−0.06	−0.34	−0.58	1.00		
Sub	0.03	−0.05	0.13	−0.03	−0.05	0.11	−0.04	−0.03	−0.09	0.11	−0.06	−0.11	−0.07	1.00	
Vm	0.19	−0.06	−0.06	−0.01	−0.01	0.34	0.40	0.03	−0.04	0.03	0.79	−0.22	−0.49	−0.14	1.00

Table S16. Correlation analysis of the variables for the city of Rome—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.02	1.00													
Sg	0.03	0.04	1.00												
Se	0.09	−0.13	−0.13	1.00											
L	0.00	−0.01	−0.18	0.27	1.00										
B	0.73	0.02	0.03	0.02	−0.05	1.00									
Yc	0.19	−0.14	−0.06	0.05	0.07	0.05	1.00								
Mp	0.06	−0.06	−0.05	0.40	0.12	−0.08	0.07	1.00							
Mg	−0.04	−0.07	−0.05	−0.26	−0.05	0.00	−0.01	−0.53	1.00						
Me	−0.02	0.13	0.10	−0.13	−0.07	0.08	−0.06	−0.46	−0.51	1.00					
C	0.06	−0.05	−0.06	−0.08	0.03	−0.01	0.45	−0.08	0.07	0.01	1.00				
Sc	0.21	−0.11	−0.09	0.10	0.10	0.15	0.11	0.14	−0.14	0.00	−0.20	1.00			
P	−0.10	0.04	−0.01	0.17	0.14	−0.14	−0.08	0.19	−0.03	−0.17	−0.23	−0.36	1.00		
Sub	−0.14	0.09	0.13	−0.19	−0.24	0.00	−0.32	−0.25	0.10	0.15	−0.27	−0.41	−0.47	1.00	
Vm	0.27	−0.11	−0.16	0.07	0.09	0.18	0.41	0.02	−0.03	0.01	0.64	0.37	−0.25	−0.52	1.00

Table S17. Correlation analysis of the variables for the city of Naples—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.32	1.00													
Sg	0.32	0.28	1.00												
Se	0.07	−0.02	0.18	1.00											
L	0.29	0.31	0.08	−0.01	1.00										
B	0.64	0.32	0.19	0.10	0.33	1.00									
Yc	0.30	0.17	0.29	−0.04	0.06	0.16	1.00								
Mp	−0.06	−0.03	−0.03	−0.16	0.01	−0.11	0.10	1.00							
Mg	0.05	0.17	−0.07	0.04	0.07	0.01	−0.08	−0.45	1.00						
Me	0.09	−0.06	0.21	0.12	−0.01	0.13	0.14	−0.28	−0.71	1.00					
C	0.26	0.09	0.00	−0.13	−0.03	0.31	0.29	0.06	−0.11	0.11	1.00				
Sc	0.06	0.00	0.14	0.15	0.19	0.04	0.00	0.04	−0.02	0.02	−0.39	1.00			
P	−0.05	0.22	0.13	−0.10	0.10	−0.07	0.03	−0.08	0.13	−0.04	−0.27	−0.23	1.00		
Sub	−0.12	−0.08	0.01	0.14	−0.11	−0.19	−0.12	−0.04	0.07	−0.05	−0.41	−0.35	−0.25	1.00	
Vm	0.35	0.21	0.18	0.05	0.08	0.43	0.28	0.00	−0.01	0.09	0.73	0.02	−0.14	−0.58	1.00

Table S18. Correlation analysis of the variables for the city of Catania—Phase I.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.09	1.00													
Sg	0.10	0.08	1.00												
Se	−0.08	−0.08	−0.04	1.00											
L	0.23	0.11	−0.17	−0.09	1.00										
B	0.50	0.03	0.18	0.00	0.14	1.00									
Yc	−0.05	−0.01	0.00	−0.06	−0.16	−0.05	1.00								
Mp	0.09	0.13	−0.04	0.01	0.03	−0.14	0.09	1.00							
Mg	0.01	−0.07	0.08	−0.06	−0.13	−0.07	0.04	−0.53	1.00						
Me	−0.10	−0.05	−0.05	0.05	0.11	0.22	−0.13	−0.37	−0.59	1.00					
C	−0.01	0.01	0.00	−0.17	−0.01	−0.02	0.39	0.17	−0.18	0.04	1.00				
Sc	0.06	−0.11	−0.02	0.07	−0.05	0.04	−0.15	0.01	−0.01	0.00	−0.47	1.00			
P	−0.07	0.11	0.07	0.09	−0.04	−0.05	−0.17	−0.11	0.24	−0.16	−0.41	−0.39	1.00		
Sub	0.02	−0.01	−0.07	0.03	0.16	0.05	−0.12	−0.11	−0.05	0.16	−0.24	−0.23	−0.20	1.00	
Vm	0.11	−0.04	−0.02	−0.10	0.07	−0.05	0.11	0.17	−0.21	0.06	0.35	0.29	−0.48	−0.29	1.00

Table S19. Correlation analysis of the variables for the city of Turin—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.36	1.00													
Sg	0.14	−0.15	1.00												
Se	0.18	0.10	−0.07	1.00											
L	−0.15	0.07	−0.27	−0.03	1.00										
B	0.81	0.30	0.15	0.15	−0.15	1.00									
Yc	0.36	0.05	0.07	−0.11	−0.22	0.21	1.00								
Mp	0.06	0.04	−0.05	0.09	−0.07	0.00	0.00	1.00							
Mg	−0.10	−0.14	0.10	−0.12	0.01	−0.15	−0.05	−0.33	1.00						
Me	0.06	0.11	−0.06	0.05	0.04	0.14	0.05	−0.41	−0.73	1.00					
C	0.34	0.17	−0.06	−0.02	−0.18	0.33	0.57	−0.05	−0.10	0.13	1.00				
Sc	−0.12	−0.09	0.13	−0.04	−0.10	−0.06	−0.10	0.02	−0.02	0.01	−0.32	1.00			
P	−0.16	−0.05	−0.06	0.04	0.25	−0.20	−0.34	0.04	0.12	−0.14	−0.50	−0.64	1.00		
Sub	−0.03	0.01	−0.02	0.04	−0.08	0.01	−0.09	−0.05	−0.08	0.12	−0.06	−0.07	−0.11	1.00	
Vm	0.38	0.23	0.05	0.05	−0.19	0.42	0.46	0.01	−0.16	0.15	0.75	0.01	−0.61	−0.03	1.00

Table S20. Correlation analysis of the variables for the city of Milan—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.29	1.00													
Sg	0.40	−0.07	1.00												
Se	0.14	0.03	−0.19	1.00											
L	0.23	0.36	−0.26	0.22	1.00										
B	0.84	0.32	0.24	0.13	0.32	1.00									
Yc	−0.06	−0.29	0.00	0.07	−0.20	−0.10	1.00								
Mp	−0.02	−0.07	−0.08	0.16	−0.05	−0.11	0.22	1.00							
Mg	−0.05	−0.13	−0.06	−0.04	−0.04	−0.12	0.15	−0.23	1.00						
Me	0.04	0.16	0.11	−0.09	0.08	0.17	−0.29	−0.50	−0.72	1.00					
C	0.23	0.02	−0.04	0.17	−0.03	0.21	0.29	−0.04	0.12	−0.09	1.00				
Sc	−0.20	0.05	−0.02	−0.07	0.04	−0.17	−0.14	0.14	−0.11	0.00	−0.76	1.00			
P	0.01	−0.10	0.09	−0.11	−0.01	−0.01	−0.19	−0.15	0.01	0.10	−0.26	−0.40	1.00		
Sub	−0.09	−0.05	−0.03	−0.09	−0.01	−0.11	−0.06	−0.05	−0.06	0.09	−0.08	−0.12	−0.04	1.00	
Vm	0.23	0.02	−0.06	0.14	−0.03	0.22	0.37	0.00	0.11	−0.10	0.84	−0.52	−0.38	−0.10	1.00

Table S21. Correlation analysis of the variables for the city of Florence—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.41	1.00													
Sg	0.14	−0.09	1.00												
Se	0.04	−0.10	−0.07	1.00											
L	0.02	0.01	−0.15	−0.07	1.00										
B	0.74	0.26	0.11	−0.02	0.12	1.00									
Yc	0.20	0.24	0.00	0.03	0.01	0.34	1.00								
Mp	0.07	0.23	−0.05	−0.05	−0.01	−0.04	0.10	1.00							
Mg	−0.06	−0.14	−0.09	0.11	−0.08	−0.24	−0.05	−0.15	1.00						
Me	0.02	0.02	0.11	−0.08	0.08	0.25	0.01	−0.33	−0.88	1.00					
C	0.28	0.06	−0.04	0.08	0.10	0.35	0.32	0.08	−0.09	0.04	1.00				
Sc	−0.14	−0.02	0.04	−0.12	−0.03	−0.21	−0.21	−0.02	0.05	−0.03	−0.62	1.00			
P	−0.14	−0.03	−0.03	0.03	−0.06	−0.14	−0.13	−0.06	0.05	−0.02	−0.34	−0.51	1.00		
Sub	0.00	−0.04	0.18	0.16	−0.10	0.04	0.22	−0.02	−0.05	0.06	−0.05	−0.08	−0.04	1.00	
Vm	0.37	0.19	0.07	0.04	0.05	0.43	0.39	0.15	−0.11	0.04	0.80	−0.27	−0.53	−0.10	1.00

Table S22. Correlation analysis of the variables for the city of Rome—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.07	1.00													
Sg	0.13	−0.13	1.00												
Se	0.07	−0.17	0.07	1.00											
L	0.03	0.14	−0.29	−0.16	1.00										
B	0.67	0.12	−0.05	−0.02	0.07	1.00									
Yc	0.31	−0.17	−0.09	0.10	−0.02	0.28	1.00								
Mp	0.07	0.15	−0.09	−0.09	0.08	−0.01	−0.04	1.00							
Mg	0.17	−0.10	0.06	0.09	0.00	0.01	0.05	−0.22	1.00						
Me	−0.21	0.01	−0.01	−0.04	−0.04	0.00	−0.03	−0.34	−0.85	1.00					
C	0.22	−0.15	−0.09	0.03	−0.01	0.29	0.90	−0.09	−0.07	0.12	1.00				
Sc	0.32	−0.07	0.15	0.11	0.11	0.15	−0.05	−0.03	0.15	−0.13	−0.18	1.00			
P	−0.31	0.06	−0.09	−0.05	−0.07	−0.24	−0.26	0.14	0.04	−0.12	−0.27	−0.56	1.00		
Sub	−0.12	0.11	0.00	−0.09	−0.03	−0.07	−0.22	−0.09	−0.17	0.21	−0.14	−0.30	−0.45	1.00	
Vm	0.35	−0.20	0.00	0.17	−0.02	0.35	0.85	−0.10	0.02	0.04	0.88	0.18	−0.41	−0.28	1.00

Table S23. Correlation analysis of the variables for the city of Naples—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.44	1.00													
Sg	0.28	0.03	1.00												
Se	−0.03	−0.09	−0.07	1.00											
L	−0.03	−0.08	−0.04	0.05	1.00										
B	0.08	−0.04	−0.03	0.13	0.16	1.00									
Yc	0.11	0.09	−0.05	−0.11	−0.07	−0.10	1.00								
Mp	0.12	0.11	−0.03	0.00	−0.10	0.02	0.03	1.00							
Mg	−0.20	−0.14	−0.14	−0.01	0.08	−0.15	0.19	−0.40	1.00						
Me	0.11	0.06	0.16	0.01	−0.01	0.13	−0.21	−0.38	−0.69	1.00					
C	0.17	0.04	−0.04	−0.01	−0.16	−0.01	0.23	0.23	−0.07	−0.11	1.00				
Sc	0.05	0.07	0.13	−0.08	0.00	−0.03	−0.05	−0.13	0.00	0.10	−0.60	1.00			
P	−0.19	−0.10	−0.07	0.16	0.13	0.06	−0.15	−0.08	0.15	−0.09	−0.38	−0.31	1.00		
Sub	−0.14	−0.05	−0.05	−0.06	0.11	−0.01	−0.12	−0.09	−0.09	0.16	−0.26	−0.21	−0.13	1.00	
Vm	0.58	0.25	0.22	0.03	−0.07	0.09	0.13	0.11	−0.11	0.02	0.52	−0.03	−0.36	−0.39	1.00

Table S24. Correlation analysis of the variables for the city of Catania—Phase II.

	Si	Sb	Sg	Se	L	B	Yc	Mp	Mg	Me	C	Sc	P	Sub	Vm
Si	1.00														
Sb	0.34	1.00													
Sg	−0.08	−0.06	1.00												
Se	0.09	0.01	−0.04	1.00											
L	0.18	0.15	−0.32	−0.06	1.00										
B	0.70	0.28	−0.04	−0.02	0.13	1.00									
Yc	0.31	−0.05	−0.09	0.08	−0.03	0.11	1.00								
Mp	−0.08	−0.12	0.13	0.01	−0.06	−0.23	0.09	1.00							
Mg	−0.18	−0.04	−0.01	−0.02	0.05	−0.15	−0.14	−0.23	1.00						
Me	0.22	0.12	−0.09	0.01	0.00	0.30	0.06	−0.52	−0.71	1.00					
C	0.17	−0.06	−0.14	0.15	0.07	0.03	0.51	0.01	−0.06	0.05	1.00				
Sc	0.01	0.08	−0.06	−0.14	0.10	0.07	−0.20	0.13	−0.03	−0.07	−0.66	1.00			
P	−0.14	0.04	0.21	0.07	−0.22	−0.02	−0.32	−0.13	0.10	0.00	−0.30	−0.41	1.00		
Sub	−0.16	−0.11	0.10	−0.12	−0.02	−0.20	−0.10	−0.09	0.02	0.04	−0.15	−0.20	−0.09	1.00	
Vm	0.25	0.12	−0.22	0.04	0.23	0.22	0.07	−0.06	−0.01	0.05	−0.13	0.56	−0.38	−0.38	1.00