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A SAM (Social Accounting Matrix) - based approach for the study of the real estate market.

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A SAM - based approach for the study of the real estate market. (paper) Outline

- 1. Introduction
- 2. SAMs for the empirical approach of a country's economic activity
 - 2.1. Basic forms and relationship with the national accounts
 - 2.2. Empirical approach to specific aspects of economic activity
- 3. Multiplier macro-effects of a change in the net taxes on the production of the real estate activities
 - 3.1. A theoretical approach to the economic activity of a country
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A SAM - based approach for the study of the real estate market 1. Introduction

SAM (Social Accounting Matrix)-based approach

 \rightarrow the transactions defined and measured by the national accounts \square are used to construct <u>numerical and algebraic versions of matrices</u>, whose underlying network of linkages enable the identification of multiplier effects of changes in net taxes on the production of the real estate activities

 \rightarrow square matrices ... with <u>row</u> sums equal to column sums

resources and changes in liabilities and net worth uses and changes in assets

each cell can have two readings, according to its row and column

→ the tool adopted in this study to measure and model the activity of a country and its specificities – in this case Portugal



2. SAMs for the empirical approach of a country's economic activity

The SAM in the basic form Correspondence												dence	_			
		f	a		р	dic	dik	dif	rw	Total	between	etween SAM		SAM accounts		national accounts
		1	2		3	4	5	6	7	rotta	1	. 1	_			14 A 4
f	1		T(f,a))					T(f,rw)	p.	and na	itional		p	products	goods and services
a	2				T(a,p)					a.	900	ounts	ion	a	activities	production
р	3		T(p,a		T(p,p)	T(p,dic)	T(p,dik)		T(p,rw)	f.	acc	ounds	product	-		Freedom
dic	4	T(dic,f)	T(dic,	a)]	T(dic,p)	T(dic,dic)			T(dic,rw)	dic.				0	factors of	primary distribution of
dik	5					T(dik,dic)	T(dik,dik)		T(dik,rw)	dik.			-	t	production	income
dif	6						T(dif,dik)	T(dif,dif)	T(dif,rw)	dif.			-		-	and the first the state
rw	7	T(rw,f)	T(rw,a	a) [T(rw,p)	T(rw,dic)	T(rw,dik)	T(rw,dif)		rw.						secondary distribution
Tota		.p	.a		.f	.dic	.dik	.dif	.rw	$\geq <$					current account	of income,
						1								dic	of (domestic)	in kind account
	C/	AM colle'		cells		national accounts transaction									institutions	use of income
	Sr		112				description code									
	de	escript	ion	T(p,di	ic)	final consumption (purchasers' prices) – expenditure incurred by resident P3							utic		capital account	
	uc		1011			institutional	nstitutional units on goods or services which are used for the direct satisfaction						stit	47-	of (domestic)	apprita1
						of individua	l needs or w	ants, or the	collective ne	eds of m	embers of the		Ë.	CLIK	or (domesuc)	Capital
						community									Insuluuons	
				T(dic,	,a)	net taxes of	on production - (other) taxes on production minus (other) subsidies								financial account	
T(rw,a) to production								227 227	27-037		of (domestic)	financial				
				T(dic,p)		net toyes o	Dal Da								institutions	
T(rw,p) (part)					subsidie	es on products D21-D31										
									rw rest of the		rest of the world	rest of the world				

NAM (National Accounting Matrix), the representation of the sequence of the national accounts

2. SAMs for the empirical approach of a country's economic activity

Macroeconomic **aggregates**/ **balancing items**



SAM aggregated or basic form - <u>"grand" totals</u>

... from them the <u>consistency</u> can be ensured in further levels of disaggregation for the study of specific aspects of the economic activity of a country

SAM cells	national accounts transactions								
	Description	Code	operation						
			[
	Gross added value	Blg							
r(a,p)	Output of goods and services	P1	+						
Г(р,а)	Intermediate Consumption	P2	-						
	Gross domestic product	Bl*g							
	Gross national income	B5g							
m(1' 0	Compensation of Factors of Production (received by	D1; B2g;							
l'(dic,t)	domestic institutions)	B3g;D4	+						
T(dic,a)	Net Taxes on Production (received by domestic institutions)	D29-D39	+						
T(dic,p)	Net Taxes on Products (received by domestic institutions)	D21-D31	+						
	Gross disposable income	B6g							
m/11 0	Compensation of Factors of Production (received by	D1; B2g;							
1(dic,1)	domestic institutions)	B3g;D4	+						
T(dic,a)	Net Taxes on Production (received by domestic institutions)	D29-D39	+						
T(dic,p)	Net Taxes on Products (received by domestic institutions)	D21-D31	+						
T(dic,rw)	Current Transfers from the rest of the world	D61;D62;	+						
T(rw,dic)	Current Transfers to the rest of the world	D7							
T(dik,dic)	Gross Saving	B.8g							
I (dif,dik)	Net lending (+) /borrowing (-)	B9							

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A SAM - based approach for the study of the real estate market.2. SAMs for the empirical approach of a country's economic activity

... focus attention on the net taxes on both production and products

		I	a	p	dic	dik	dif	rw	Total		🖝 🏳	Ortua	<u>a</u> 1	(10)	6 еш	rng)							
		1	2	3	4	5	6	7	Total		1	ortug	ai	(10	Cu	105)							
f	1		T(f,a)					T(f,rw)	p.									a					
a	2			T(a,p)					a.	1		a01	a02	a03	a	04	a05	a06	a07	a08	a09	a10	total
p	3		T(p,a)	T(p,p)	T(p,dic)	T(p,dik)		T(p,rw)	f.	1		3	4	5	0	5	7	8	9	10	11	12	1010
dic	4	T(dic.f)	T(dic.a)	T(dic.p)	T(dic,dic)			T(dic.rw)	dic.	$1 \square$	nfc 23	0		0	0	0	0	0	0	0	0	0	0
dik	5				T(dik.dic)	T(dik.dik)		T(dik.rw)	dik.		fc 24	0		0	0	0	0	0	0	0	0	0	0
dif	6				,	T(dif.dik)	T(dif.dif)	T(dif.rw)	dif.	dic	$\frac{g}{h}$ 25	- 1 686	88	0	143	863	228	990	2 032	83	- 1 060	- 484	1 988
rw	7	T(rw.f)	T(rw.a)	T(rw.p)	T(rw.dic)	T(rw.dik)	T(rw.dif)		rw.	1 2	npi 27	0		0	0	0	0	0	0	0	0	0	0
Tota	al	.p	a	f	dic	dik	dif	rw	\sim	1 🗳	total	- 1 686	88	1 1	143	863	228	990	2 032	83	- 1 060	- 484	1 988
										u rw	v 37	034	488		70	478	126	548	1 126	46	588	268	. 1 101
	cells		national accounts transaction									307	- 700	-	/3	4/0	- 120	- 540	-1120	- 70	500	200	-1101
	CCIIS				description	n			code														
T(dic,	,a)	net tax	net taxes on production - (other) taxes on production minus (other) subsidies															p					
T(rw,	a)	to prod	to production									p01	p02	p03	F	04	p05	p06	p07	p08	p09	p10	total
T(dic,	,p)	net tax	es on produc	ts - taxes of	n products m	inus subsidie	s on product	c	D21-D31	-	6 22	13	14	15		16	17	18	19	20	21	22	TOTAL
T(rw,	p) (pa	rt)	es on produc	15 - 1ancs 0	i products in	ulus subsidic.	s on product	°	D21-D31	1	ntc 23			0	0	0	0	0	0	0	0	0	0
											g 25	15		0	0	0	0	0	0	0	0	1 707	0
										dig	h 26	15	100	0	0	2 369	962	1 140	15	2 496	15	1 /8/	20 344
hasic SAM (7x7) • disaggregated SAM (37x37)									npi 27			0	0	0	0	0	0	0	0	0	0		
								total	150	16 6	39	576	2 569	962	1 140	13	2 496	13	1 787	26 344			
									fW	v 37	3 620	65.8	23	128	6 200	1 530	714	11	3 534	54	60	81 700	

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A SAM - based approach for the study of the real estate market. 2. SAMs for the empirical approach of a country's economic activity

.. disaggregation between taxes and subsidies ...

	other ta	xes on n (D.29)	other sub production	sidies to n (D.39)			
activities (industries)		10 ⁶ euros	%	10 ⁶ euros	%	products (goods and services) of activit	y
Agriculture, forestry, and fishing	a01	56	2	808	41	Agriculture, forestry, and fishing	p01
Industry, energy, water supply and sewerage	a02	463	16	71	4	Industry, energy, water supply and sewerage	p02
Construction	a03	78	3	15	1	Construction	p03
Wholesale and retail trade, repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	a04	477	17	92	5	Wholesale and retail trade, repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	p04
Information and communication	a05	136	5	34	2	Information and communication	p05
Financial and insurance activities	a06	446	16	4	0	Financial and insurance activities	p06
Real estate activities	a07	944	33	37	2	Real estate activities	p07
Professional, scientific, and technical activities; administrative and support service activities	a08	99	3	62	3	Professional, scientific, and technical activities; administrative and support service activities	p08
Public administration and defense; compulsory social security; education; human health and social work activities	a09	102	4	575	29	Public administration and defense; compulsory social security; education; human health and social work activities	p09
Arts; entertainment; repair of household goods and other services	a10	35	1	251	13	Arts; entertainment; repair of household goods and other services	p10
total		2 836	100	1 949	100	total	



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1	٢.
/	
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taxes on products

(D.21)

380

575

2 630

976

13

13

1 1 38

2 4 9 2

1 784

26 636

16 634

%

62

2

10

1

0

0

7

100

10⁶ euros

subsidies on

products (D.31)

230

20

0

65

16

0

0

0

331

%

70

6

0

20

5

0

0

C

0

0

100

10⁶ euros

2. SAMs for the empirical approach of a country's economic activity

.. functional distribution of generated income - distribution of gross added value (GAV) among factors of production...

	generated in gross don	come, or gross ad nestic income (mil	ded value, or lion euros)	structure of	activities by fac	tors (%)	structure o	of factors by act	real estate		
factors of rodu	iction	labour (employees)	other (employers and own-account workers; capital)	total	labour (employees)	other (employers and own-account workers; capital)	total	labour (employees)	other (employers and own-account workers; capital)	total	activities \rightarrow generated
activities (industries)		(f)l	(f)o		(f)l	(f)o		(f)l	(f)o		/ Sonorated
Agriculture, forestry, and fishing	a01	1 210	3 649	4 859	1	4	3	25	75	100	12% of the
Industry, energy, water supply and sewerage	a02	14 256	15 947	30 203	17	19	18	47	53	100	1 .
Construction	a03	4 372	2 429	6 801	5	3	4	64	36	100	domestic
Wholesale and retail trade, repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	a04	21 141	20 296	<mark>41 437</mark>	25	25	25	51	<mark>4</mark> 9	100	income
Information and communication	a05	3 045	2 795	5 840	4	3	3	52	48	100	\rightarrow paid 3370
Financial and insurance activities	a06	3 829	4 239	8 068	4	5	5	47	53	100	of the taxes
Real estate activities	a07	653	19 636	20 289	1	24	12	3	97	100	
Professional, scientific, and technical activities; administrative and support service activities	a08	8 485	4 440	12 925	10	5	8	66	34	100	on production
Public administration and defense; compulsory social security; education; human health and social work activities	a09	25 759	7 409	33 168	30	9	20	78	22	100	production

Arts; entertainment; repair of househ

goods and other services total (other) taxes on production of real estate activities **•** our focus for



experimenting a change, representative of one or several policy measures

3. Multiplier macro-effects of a change in the net taxes on the production of the real estate activities

accounting multiplier model \Leftrightarrow SAM algebraic version \Rightarrow makes it possible to quantify the macroeconomic effects of that change

... assumptions

- 1) structural features of the numerical version are the relevant and do not change
- 2) resources' endowment is provided and there is no full employment
- 3) production technology is provided
- 4) the relevant transactions are those that are measured by the national accounts, as defined by the underlying system

Static analysis, at current prices

- .. accounts and ... transactions are organised into..
- endogenous, if defined in the modelling process
- exogenous, if defined outside the modelling process and if exerts an influence on the endogenous group



3. Multiplier macro-effects of a change in the net taxes on the production of the real estate activities

				Uses			
		Endogen	Endogenous			Total	
			Sum		Sum	Total	
es	Endogenous	$\begin{split} \mathbf{N} &= \mathbf{A}_{\mathbf{n}}.\hat{\mathbf{y}}_{\mathbf{n}} \\ (\mathbf{A}_{\mathbf{n}} &= \mathbf{N}.\hat{\mathbf{y}}_{\mathbf{n}}^{-1}) \end{split}$	n	X	x		
Resourc	Exogenous	$L = A_1 \hat{y}_n$ $(A_1 = L \cdot \hat{y}_n^{-1})$	1	R	r		
4	Total	y'n		y' _x			

$$y_n = n + x = A_n \cdot y_n + x = (I - A_n)^{-1} \cdot x = M_a \cdot x$$

$$l = A_l \cdot y_n = A_l \cdot (I - A_n)^{-1} \cdot x = A_l \cdot M_a \cdot x$$

with the accounting multipliers (M_a) , the impact of changes in receipts is analysed at the moment, assuming that the structure of uses in the economy does not change

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3. Multiplier macro-effects of a change in the net taxes on the production of the real estate activities

fiscal policy measures that annul the value of other taxes on production paid by real estate activities, net of the other subsidies to production received by the same

 \Leftrightarrow changes in taxes and/or subsidies ... uses of the "real estate activities" and resources of the general government [SAM's cell (g, a07)] and of the rest of the world [SAM's cell (rw, a07)]

algebraic version of the SAM ... exogenous account, "real estate activities" (a07); endogenous accounts, all the others; A_n , A_l and M_a were calculated

.. cells of (g, a07) and (rw, a07) were annulled... an "adjusted" SAM was calculated

... the "adjusted" gross macroeconomic aggregates and balancing items were calculated

gross macroeconomic	million	%	
aggregates and balancing items	b(efore)	a(fter)	a/b -1
Domestic Product	195 947	188 618	-3,74
National Income	191 348	183 096	-4,31
Disposable Income	195 931	187 684	-4,21
Saving	35 717	34 557	-3,25
Net lending (+) /borrowing (-)	3 601	3 498	-2,86

... the multiplier effects, spread throughout the matrix versions underlying our approach, resulted in a significant negative impact [results conditioned by the modelling assumptions]



4. Summary and concluding remarks

supported by the national accounts and the underlying system, a SAM-based approach is adopted for the study of the real estate market and its specificities

 taxes and subsidies on the production of the real estate activities .. identified as the source of policy measures and the corresponding macroeconomic effects

- quantified through the use of an accounting multipliers model
- summarised at the level of certain macroeconomic aggregates and balancing items
- \rightarrow tool ... with <u>potential</u> and <u>limitations</u>

• the adoption of the national accounts – both system and data – as the base source for the design and construction of SAMs enables <u>access to a large range of users</u>, who can benefit from the availability of (more or less) complete quantitative information, whose <u>regularity of publication</u>, flexibility, and consistency, provides the <u>possibility to compile time series of matrices</u>... complemented (or not) by additional sources (e.g., business, international statistics) [the sources and the methods underlying the data being used should not be neglected.. <u>to avoid biases in their reading and in the interpretation of the results obtained from the modelling]</u>



- 4. Summary and concluding remarks
- \rightarrow tool ... with <u>potential</u> and <u>limitations</u> (cont.)
- ... possible to speak in terms of <u>past</u>, <u>present</u>, <u>and future</u>.. <u>ex-ante and ex-post</u>.. <u>static</u>, <u>comparative static and dynamic analysis</u>
- .. the range of the <u>possibilities of econometric and other types of modelling</u> .. can be extended

• .. the results obtained after running the adopted models for any kind of simulation can be expressed in terms of the commonly-used <u>macroeconomic aggregates and items</u> that are disseminated by information agencies and other means of communication <u>with which the public is familiarised</u>

• .. it is also important to at least possess an idea regarding which parts of our study are not measured by the adopted statistical sources, as these could potentially be of interest – especially with regards <u>potential</u> "contributions" to the hidden economy



Thank you for your attention!

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