ESTIMATING TRADE BALANCE FOR A SMALL REGION:

Beira–Estrela, Portugal

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Abstract

This paper estimates the trade balance for a small region located in inland Portugal – Beira-Estrela – geographically defined as the merge of 3 official NUT III regions – Beira Interior Norte, Serra da Estrela and Cova da Beira. This estimate disaggregates by 30 commodities and includes three essential parts: first, the international trade of goods and services; second, the net balance between in-region consumption by foreigner non-residents and the international consumption by residents, and finally the interregional trade that includes the net balance for Portuguese tourists visiting Beira-Estrela and the consumption of out Beira-Estrela Portuguese residents. Interregional trade (not available in official statistics) is the residual between supply and demand of the different groups of commodities considered in a regional Make and Use table we derive for Beira-Estrela. This regional matrix is the outcome of the application of a simplified non-survey method to the Portuguese (National Accounts provided) Make and Use table decomposition. The aim to assess to the relative importance of tourism in the Beira-Estrela regional trade balance is achieved, in a preliminary approach followed in this paper, through the analysis of the trade on hotel and restaurant services. Furthermore, we argue that, unlike countries, regions do not benefit from trade surpluses and these surpluses are just the counterpart of the income drainage or capital outflows, which weaken the economic region basis.

Estimating the Trade Balance for a Small Region:
Beira-Estrela[1] – Portugal

This paper is part of a wider project aiming to study a particular Portuguese region defined as Beira-Estrela (BE, here on). The estimation of a trade balance for this small inland region, and the evaluation of the importance of national and international tourism in BE's economy are primary goals of our research.

The trade balance of a region is composed by 4 parts: (i) the net imbalance of international commodity trade; (ii) the imbalance between domestic consumption made by foreign residents and foreign consumption made by residents; (iii) the interregional exports-imports and finally, (iv) the imbalance associated to the Portuguese residents consumption in other domestic regions. In the project the focus is centered in the last two interregional components, while international flows can be directly taken from official statistics sources or simply estimating left over values. It is also a goal of the project to separately estimate the two components of the interregional trade balance – commodity and tourist flows – given our aim of evaluating tourism impact on the region, but at this point the values are not yet disaggregated. We then provisory discuss in the paper, the BE trade balance, dividing each of its 3 components already available in 30 groups of commodity, corresponding to the NPCN31 95 of the Portuguese National Accounts for the year of 1999.

The methodology to obtain interregional trade involving BE is based on the Make and Use (M-U) (or Supply and Use) table, built for the region similarly to the National Accounts one, according to the principles followed by the ESA 1995 (European System of Accounts) to the country as a whole[2]. This National Accounts table is a subset of the Input-Output (I-O) system in ESA 1995 being, as a rule, the only table of this system annually published. Moreover this M-U table is, in fact, the basis for all derived I-O tables produced at the national level under more or less simplified assumptions, each five years, namely the symmetric tables used by the Leontief

model. Playing this key role, the M-U is therefore the most credible table of the entire National Accounts I-O system, and that is the reason why we built our calculation upon it. To BE region, the M-U table was derived from the national table applying a set of indicators that identifies the regional share in each entry, making then use of a so-called non-survey method.

Interregional trade (including the associated tourist flows) is then estimated, for each product, on that regional M-U table, by the difference between the entire supply in the region – including international imports – and the demand revealed by households and other resident institutions added to international flows such as exports or consumption made by non-Portuguese and non-resident tourists[3]. This kind of estimated interregional flows are net while, for each product, the difference between interregional exports and imports is calculated even we never know any of these gross values with opposite signal.

A remaining problem in this preliminary paper is that, in opposition to what happens when building general M-U table, the split of interregional trade imbalances of tourism and other commodity flows cannot be done using indicators or non-survey methods. And the explanation turns out to be very simple: the national value of interregional trade imbalances is zero by definition, for each flow and product, with no national values left to share among regions. In this case the only chance to isolate interregional tourist flows from the whole trade flows needs a special survey, which we are carrying on applying it in BE's hotel and restaurant customers (unfinished yet). A second reason that will lead us to review the present results has to do with the estimate of BE resident household consumption expenses. Hopefully this estimation should be carried to all national regions at the same time, providing the necessary consistency among regional estimates sum, product by product, and the constant values of National Accounts as seen in Sargento and Ramos (2003). Nevertheless this

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[3] For an analysis of the various methods that may be used in estimating regions' external trade, see West (1990). Harris and Liu (1998) also admit an alternative approach, in which a Location Quotient estimation of external trade is included in an input-output table, as an alternative to the assessment of external or interregional trade by the supply/demand residue. For an extensive comparison of these two methods, see also Sargento (2002) and Sargento and Ramos (2002). On the other hand, this method of estimate of net interregional trade has been adopted in several recent I-O work carried out in Portugal: CCRN/MPAT (1995), CCRA (2001), Sargento (2002) and Sargento and Ramos (2002, 2003). Another although different approach based on transport statistics can be seen in Ramos (2001), although this approach just uses physical and non monetary values, not compatible with I-O models.

is a heavy work we didn't accomplish at this stage, leading to that some inconsistencies between National Accounts and other statistical sources – namely the Survey on Households' Budgets - may be harming the here presented results.

The remaining of this paper can be divided in two well-delimited parts. In Part I and according to the main project goals - to assess the trade balance and the impact of tourism activity in the regional economy - the results for BE's trade balance are presented, at a provisory level, together with a summary evaluation focused on Hotel and Restaurant activity. In Part II, we provide an explanation for the procedures of BE's M-U table construction upon which we based our estimate on BE's interregional trade.

Part I
BE trade balance: summary evaluation

The analysis of regional trade balance is in our viewpoint a crucial issue in order to characterize regional economies, although it has been very often forgotten in literature, partially due to the difficult procedures to accurately estimate the imbalances in what interregional flows concerns. Nevertheless we do believe that it is important to look at this indicator even assuming that its estimate contain some inevitable inaccuracy. In fact, a deficit in trade balance – considering goods and services trade – indicates that the region economically depends on income coming from other regions in the same country and other countries, on unrequited transfers, or even on capital inflows from those regions. This other regions dependence is not necessarily a bad thing whereas some of the flows benefiting the region can have a structural basis and then can be considered sustainable. This is the case for elderly regions where social funding and pensions from social security and other central government distributive instruments are deemed to be sustainable. On the other hand, a superavit is no doubt undesirable for less developed regions once it represents that the income of the poorest regions is being drained outside the regions, or other transfers are out-flowing to the rest of the country or to other countries, or even that capital flee out of those poorest regions.

Table 1 ahead presents the provisory estimate to the BE's trade balance, containing 3

blocks: (i) international trade, (ii) consumption imbalance connected with international tourism and (iii) interregional trade (including the associated domestic tourism flows). Besides the balance is composed of 30 products as said before.

TABLE 1 – THE BE's TRADE BALANCE

	International trade	Net consum. by foreigner residents	Interregional trade	Total
Products of agriculture, hunting and forestry	-728	120	105572	104965
Fish	-102	18	-6842	-6926
Coal and lignite; peat, crude petrol. and natural gas; uranium and thorium	0	0	-7637	-7637
Mineral ores and other mining and quarrying products	4140	0	-1801	2339
Food products; beverages and tobacco	5499	1157	-90091	-83435
Textiles and textile products	195558	2401	16491	214450
Leather and leather products	1940	671	26129	28740
Wood and wood products	33259	251	-32682	828
Pulp, paper and paper products; recorded media; printing services	-17	518	-33591	-33091
Coke, refined petroleum products and nuclear fuel	-187	354	-48403	-48237
Chemicals, chemical products and man-made fibres	-843	134	-110182	-110891
Rubber and plastic products	4288	0	-22118	-17829
Other non-metallic mineral products	-436	1126	-17307	-16618
Basic metals and fabricated metal p.	1668	93	-32548	-30787
Machinery and equipment n.e.c.	-2266	0	-10593	-12858
Electrical and optical equipment	69575	0	-5301	64274
Transport equipment	-47949	0	-18817	-66766
Other manufactured goods n.e.c.	2650	827	-30074	-26598
Electrical energy, gas, steam and hot water	-125	0	-31481	-31607
Construction work	16	0	0	16
Wholesale and retail trade serv.; repair serv. of motor vehicles, personal and household goods	707	94	-127134	-126332
Hotel and restaurant services	-865	-5862	-14734	-21461
Transport, storage and communication services	5270	612	-46784	-40902
Financial intermediation services	-849	244	-75157	-75762
Real estate, renting and business serv.	-11084	3798	6807	-479
Public administration and defence serv.; compulsory social security serv.	0	0	0	0
Education services	0	0	17530	17530
Health and social services	0	9	29918	29927
Other community, social and personal service services	-1193	706	19412	18925
Private households with employed persons	0	0	0	0
Total Balance	**257928**	**7270**	**-541419**	**-276221**

unit: thousands of Euros

The first conclusion is that BE trade balance registered in 1999 a deficit of 276,221 thousand Euros (about 15.6% of the regional GDP) mostly explained by interregional trade, once international trade and net flow of associated international tourism consumption are positive. This deficit should not be considered a surprise itself. This region was, in fact, one of the positive contributors to the huge Portuguese emigration to central Europe in the XXth century 60's, which turns plausible that they send now the counterpart transfers partially financing the trade deficit. Actually emigrant deposits in the BE banking agencies in 1999 accounted for 7.9% of total mainland deposits even if regional population responds for only 2.6% of that reference total population[4].

Another important deficit financing source can be the above-mentioned general government distributive activity. However, the total amount of the funds re-distributed by this channel may not be so considerable, even acknowledging the fact those interior regions in Portugal are more aged, largely benefiting from pensions, because average pensions of rural workers are quite low. Respecting the capital flows we believe the region is unlikely to be an inflow receiver at that year once, according to the estimate we have got for the trade balance, investment in gross fixed capital in the region is meaningless: 16% of the total regional GDP comparing to the national share of 27.3%. Overall this could mean that the BE trade deficit is explained essentially through the consumption side instead of investment.

Table 2 ahead shows the regional structure of the GDP (expenditure side), comparing to the correspondent national share, upon which we built our estimate.

Furthermore, looking at the trade balance disaggregated by products, there is evidence on the first place occupied by textile industry in regional exports, mainly in international trade. But then, regional agriculture also plays an important role (in a country that is not rural overall) especially in interregional trade. A general overview on BE trade balance suggests that this is a region specialized in a few industrial branches (textile, electric and optical equipment, and wood products), clearly directed to international markets but mostly sturdily dependent on interregional imports.

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[4] We choose mainland instead of total data for Portugal in this comparison, because Portuguese islands shelter financial off-shores that provide considerable fiscal advantages for emigrants applications

TABLE 2 – THE GDP AND ITS COMPONENTS (EXPENDITURE SIDE)

	Beira-Estrela		Portugal (%)
	thousands of Euros	%	
Private consumption (on national territory)	1271644	71,7%	63,7%
Government and NPIs consumption expenditure	495593	28,0%	21,2%
GFCF	283957	16,0%	27,3%
Change in inventories plus net acquisition of valuables	14634	0,8%	1,0%
International exports	381972	21,5%	25,6%
International imports	124044	7,0%	38,8%
Interregional net exports	-541419	-30,5%	-
Discrepancy vis-à-vis[5] official statistics	-9511	-0,5%	-
GDP	1772826	100%	100%

Facing the aim of the whole project it is very interesting to analyze tourism impact in BE's economy what can be achieved in a preliminary approach through the trade on hotel and restaurant services. In this particular there is a surprisingly deficit in the transactions between the region and the rest of the world, which means that resident household and institutions spend more outside the region than non-residents spend in the region. As for the deficit recorded as international trade, referring to international businesses, it is deemed to be a reasonable amount once the National Accounts show up as well a negative value in this item for the country as a whole. The deficit in consumption for foreign resident tourists suggests the Spanish one-day visitors are composing the great share of regional demand because they do not stay and spend in Portuguese hotels.

Most surprisingly is the interregional trade deficit, even when one considers that a number of national visitors do not stay in regional hotels. We admit that yet this number can be revised in a definitive version of the paper, but we conclude at the moment, either there is no evidence the region is conveniently taking advantage of its whole tourism potential or the tourism activity, show up being relevant to the regional economy.

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[5] Taxes less subsidies on products are regionalised as whole by a conventional proportional rule for reaching regional GDP after the GVA value in the official Regional Accounts. Our more detailed commodity by commodity procedure in regionalizing taxes less subsidies made unavoidable this discrepancy
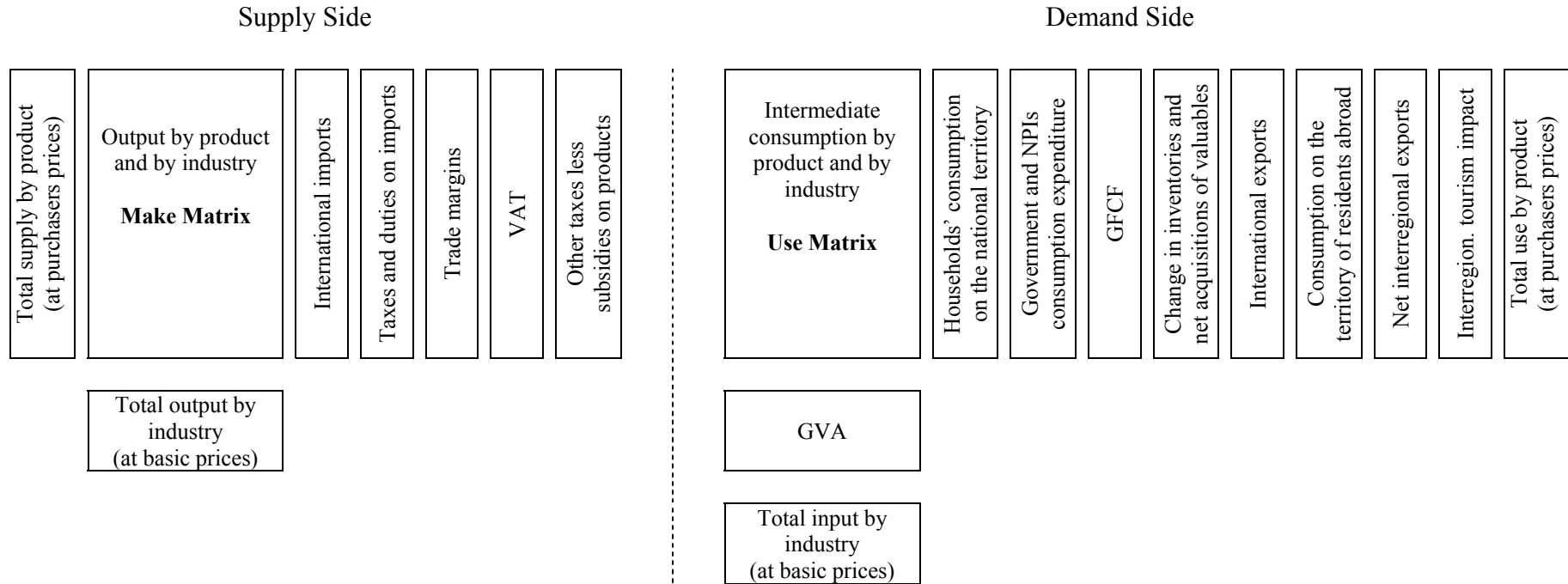
Part II

Constructing the Make and Use Framework for Beira-Estrela (BE)

As we said before, the estimation of the interregional trade flows is based on an accounting framework called the Make and Use (M-U) table. This is a special kind of input-output model, and matches the most common way National Accounts information by industries is available under the 1995 European System of Accounts (ESA 1995). The estimation of the interregional trade for Beira-Estrela (BE) refers to the year of 1999 and is a two-step procedure. First, we regionally decompose the national M-U table provided by the Portuguese National Accounts – using a very simplified non-survey method – in order to produce an equivalent table for BE. The BE's M-U table, depicted in the standard structure in Figure 1, shows a disaggregation by 30 commodities encompassing 30 industries. In a second step, we derive a vector for interregional trade, in 30 products we dealt with, computing the remaining values after the total supply and use of each product in the M-U table. These residues, which may assume positive or negative values, were in fact the net values of interregional trade, i.e. they refer to the difference between gross exports and imports. On the other hand, the interregional trade estimates coming out from this process also include the associated balances to the consumption of Portuguese residents traveling within the country, to or from BE, that we were not able for the time being to detach from the core vector of interregional trade. The purpose of this second part of the paper is then to describe the first step procedure, building the regional M-U table for BE represented in Figure 1.

The GVA and the production by industry

The regional Gross Value Added (GVA) by industry calculated at basic prices, was the starting point in the construction of the BE's M-U table. These GVA values correspond to the official figures produced by the Portuguese Regional Accounts by NUTS III. Furthermore, we assumed the same regional and national ratios for GVA on total production within each industry at the most disaggregated level we could work with – in fact 60 industries. This is the procedure that allowed assembling the vector of the total output by industry at basic prices, which is the same than total

Figure 1 – The Make and Use Frame for Beira-Estrela

Supply Side

Total supply by product (at purchasers prices)	Output by product and by industry **Make Matrix**	International imports	Taxes and duties on imports	Trade margins	VAT	Other taxes less subsidies on products

Total output by industry (at basic prices)

Demand Side

Intermediate consumption by product and by industry **Use Matrix**	Households' consumption on the national territory	Government and NPIs consumption expenditure	GFCF	Change in inventories and net acquisitions of valuables	International exports	Consumption on the territory of residents abroad	Net interregional exports	Interregion. tourism impact	Total use by product (at purchasers prices)

GVA

Total input by industry (at basic prices)

inputs (of course, for each industry, the identity between total input and total output shall hold).

The Make Matrix and the Use Matrix

The Make Matrix describes the output by product produced by each industry. The Use Matrix, on its turn, includes the inputs of each product consumed by each industry. These inputs, also known as intermediate consumption, include commodities imported from other countries or regions and not exclusively those produced in BE. The Make and Use matrixes were regionally estimated at the most possible disaggregated level: 137 commodities x 60 industries. For the Make Matrix the assumption made is that the mix of products produced by each industry is the same at the regional and national levels. The equivalent hypothesis for the Use Matrix is that the share of each input in total industry input is the same in BE and the country. Using input-output analysis nomenclature, this means identical technical coefficients assumption at both regional and national level. However, these hypothesis kept at a more disaggregated level, do not imply the technical and the product coefficients remain the same in BE and the country, when we aggregate for 30 products/30 industries – the level we presented our results.

Households' consumption (on national territory)

Households' consumption on the national territory comes from subtracting the consumption made outside national territory from total households' consumption. The former value for total outside consumption was based on an estimate of BE's purchasing power, according to the regularly published study by the Portuguese National Statistical Institute (EPCC, 2002). The structure by commodities of the consumption made outside economic territory is assumed being equal to the structure by commodities of non-residents' consumption on Portuguese territory provided in the National Accounts.

We got the vector of total consumption (inside and outside the national territory) by households living in BE in two stages: firstly, we calculate the total aggregate regional consumption; secondly we disaggregate it by products. The estimate for the

total regional consumption – our first step – came in fact from the average values achieved through three different methodologies:

1) assuming similar regional and national propensities to consume. Households disposable income is not available through Regional Accounts for a small region as BE; we overcame this missing values relying on the Região Centro[6] disposable income also assuming the part of that disposable income pertaining to BE equals the share of BE's GDP on GDP of Região Centro;

2) deriving the regional from the national consumption through the share of BE Purchasing Power shown by EPCC (2002), and finally

3) calculating consumption by multiplying the estimate of the average regional expenditure (in 2000s Survey on Households' Budgets) by the number of BE's households provided in the 2001 Census. The result was then adjusted considering the actual total national value for households' consumption in the year of 1999.

The disaggregation, by commodities, of the BE households' consumption corresponding to the second stage is based, as well, on the Survey on Households' Budgets output. And here we face a problem because the survey does not provide statistically significant results for a very small region as BE. The procedure we adopted assumes the same average expenditure, by product, in BE and Região Centro, but re-weights the estimates for BE considering the age structure of the head of each household and the main income's source the households benefit in BE; for that re-weighting procedure we used 2001 Census information. We proceeded in the same way to estimate the total average expenditure by household in BE.

Government and Non-Profit Institutions serving households (NPIs) consumption expenditure

It was assumed that final consumption expenditure by general government and NPIs is always locally produced with neither exports nor imports. Thus, the calculus of consumption values is based on the regional production of non-market services. For the products that are both disposed as market and non-market output (for instance

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[6] The NUTS II upper region where BE is included.

Education and Health services) it is assumed that the regional/national share of non-market part is the same than to the whole supply.

Gross Fixed Capital Formation (GFCF)

In what GFCF concerns, we developed a specific regionalizing methodology only for the most relevant commodities. For the remaining commodities, BE values were obtained through the simplified Change in Inventories methodology described ahead. In Construction branch it was assumed that the location of production is also the place of investment, which means that interregional trade flows equal to zero. Thus, the regional GFCF in Construction was apparently equal to the difference between total supply and total demand of the output of this industry. The GFCF values corresponding to investment in machinery and other equipments, including transport equipments, were obtained in consideration with the region's weight on national imports of the above-mentioned commodities. Finally, it was assumed that investments made in vehicles repair services, in real estate services, and in computer related and other business services are complements of other investments; therefore, the regional weights of these types of GFCF were considered equal to the regional/national GFCF weights for corresponding products.

Change in inventories and net acquisition of valuables

To estimate these flows, it is assumed that the expended value at a regional level, is a ratio of the national level amount, weighted for each commodity supply in the region on the national commodity supply as a segmenting key by region (this is, in fact, a very simplified hypothesis, to the extent that the change in stocks of raw materials should depend on the output of the consumer industry and not on the output of the raw material itself).

International exports and imports

International exports and imports of goods by regions came directly from the Portuguese National Statistical Institute surveys (in fact, we could have these values with a maximum disaggregation for 30 commodities). Services exports are assumed

as a proportion of the production in the pertinent industries in the region; services imports are either a proportion of the regional intermediate demanded by other industries, or their final consumption, depending on the very nature of the service.

Consumption on the regional territory by residents abroad

For the estimate of this flow we divided travellers into 2 groups: those who spent at least one night in Portugal (tourists), and those who came into and exited the country on the same day (trippers). Portuguese National Accounts only previously provide the total expenditure for the 2 groups together (though discriminated by commodities). The detached value – at the national level – was accepted relying on several different indicators: the number for both kinds of visitors; the average staying of tourists and the daily average expenditure for both groups. The regionalization of these dissociated values is again a critical point because BE is not highly demanded by tourists, unlike trippers that are deemed to be important for the region. The reason for that relevance is that BE is close to one of the utmost important Portuguese land frontiers, daily crossed by thousands of trippers: Vilar Formoso. So, this regionalization procedure is carried out for tourists, using a ratio of the in-region night's lodging of residents abroad over the national total while for trippers we took into account the entrance number from residents abroad through Vilar Formoso boarder over the total entrance value from non-residents in Portugal through land frontiers. However, in gathering trippers expenditure in BE we assumed that only 2/3 of the foreign tripper residents crossing Vilar Formoso boarder remained in BE.

Respecting the structure of visitors' consumption by commodities we just had the National Accounts overall information, which is organized neither at regional level nor discriminated by the 2 groups (tourists and trippers). We had no reason to assume different product structures by regions (within each group of visitors); the same cannot be certainly said for the 2 groups because obviously only tourists spend on lodging. The followed procedure, carried out at national level, consists on assuming an initial set of values for commodity consumption for the 2 groups adjusted, by a RAS-type methodology, to the total expenditure by group previously estimated and also to the National Accounts consumption values by products. The initial matrix was

settled assuming, for tourists, the same structure than the National Accounts total and redistributing, for trippers, lodging by other items of expenditure. For BE region we kept, within each group, the same consumption structure we estimated for Portugal, taking into account the different weight of tourists and trippers expenditure in total visitors consumption in this region.

Taxes and duties on imports

It was assumed that the tax rates implicit in the M-U national table were also valid to BE; these rates matched the estimated values for international imports.

Trade margins, VAT and other taxes minus subsidies on products

All these values were estimated on the demand side of the M-U frame. Through National Accounts we knew the distribution of these variables according to the classes of expenditure they fell upon. Assuming the same margin and tax rates by product for the region and for the country, and having already available the full estimation of the demand side in the regional M-U table, we could derive then the same variables for BE. However, concerning the trade margins on motor vehicles and motorcycles, retail margins of automotive fuel and other retail margins, we strained constraints compelling the values of margins to be equal to the output of these BE's services. In fact, those constraints generate slight shifts in regional margin rates vis-à-vis national ones. Nevertheless, the same kind of assumption was not adopted for the wholesale trade margins while this kind of margins, even when they stand for BE expenditure, can benefit traders whose place of business is out of BE and whose production is then assigned to other regions. When this is the case, and it happens in a relevant scale, we record interregional imports (or exports in the opposite case) for the wholesale trade.

An important outcome of this regionalizing procedure for trade margins, VAT and other taxes minus subsidies on products, is that interregional trade is evaluated at basic prices (i.e. excluding margins and taxes minus subsidies on products). Therefore, we can find non-null supply in our M-U frame for BE, respecting some commodities that are neither produced or internationally imported by the region in a relevant scale, as fish products or refined petroleum products. That supply

corresponds to the trade margins, the VAT and the other taxes on products (minus subsidies) that match the products demanded in the region being interregional imports.

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