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TOURISM AND INCOME DISTRIBUTION: GENERAL EQUILIBRIUM MODELS APPLIED TO THE GALICIAN ECONOMY

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Resumo

O turismo é unha das actividades económicas cunha maior taxa de crecemento en todo o mundo nas últimas décadas, aínda a pesar da actual situación. Neste contexto, é fundamental cuantificar de forma concreta cales son os posibles efectos macroeconómicos, tanto positivos como negativos, do turismo sobre unha economía rexional, como a galega. Ademais, tórnase esencial coñecer cal é o seu impacto directo e indirecto sobre o benestar da sociedade. Por iso, estimar e analizar estes temas, a través de diferentes modelos que recollan o funcionamento da economía como un todo, é o obxectivo central da presente tese.

En certos aspectos, a expansión do turismo obtivo un éxito rotundo, causando aumentos da renda e maiores oportunidades de emprego para a poboación residente. Tamén presentou beneficios a partir do punto de vista da recuperación de patrimonio histórico e natural (a través da declaración de parques nacionais, por exemplo), a rehabilitación de edificios e lugares históricos ou o establecemento de estándares de calidade en zonas turísticas.

Non cabe dúbida, polo tanto, de que o turismo, como conxunto de actividades, desempeña un papel importante na estratexia de crecemento dunha economía, e que ten fortes efectos parciais sobre a produción, o emprego, o sector externo, o sector público, a estabilidade dos prezos, a redistribución territorial de ingresos ou o uso da terra. Estes efectos non poden ser sempre valorados como desexables ou positivos. É evidente que o turismo ten externalidades sobre o medio ambiente, a estrutura social, e, polo tanto, sobre a súa sostibilidade económica futura.

Dende un punto de vista económico, o desenvolvemento do turismo modifica os prezos relativos, e iso provoca diversos efectos directos sobre a distribución de recursos, e tamén efectos indirectos sobre os patróns de consumo e produción económica, o que pode producir cambios significativos da estrutura produtiva a longo prazo. Ademais, unha expansión do turismo pode ter impactos significativos sobre a distribución da renda no plano individual (debido á súa gran capacidade de xeración de emprego en varios segmentos da sociedade, tanto cualificados como non cualificados) e, a nivel rexional (dando oportunidades de negocio para áreas rurais que representan un elemento de fixación da poboación dun territorio e favorecendo a creación e renovación de infraestruturas).

En consecuencia, non é suficiente con amosar as cifras macroeconómicas, en termos de Valor Engadido Bruto (VAB), produción ou número de empregos creados para comprender os beneficios totais do turismo a nivel rexional. Tamén habería que considerar o papel dos prezos e os mecanismos de distribución da renda particulares de cada economía para cuantificar os cambios no benestar asociados a un aumento do consumo turístico. Máis aínda, o desenvolvemento do turismo pode seguir diferentes modelos, que, á súa vez, poden producir impactos agregados semellantes, pero con diferenzas significativas nos efectos distributivos.

De feito, son estas diferenzas rexionais na estrutura inter-industrial, así como, nos seus sistemas de distribución e de redistribución das rendas, as que xustifican a obriga de análises particulares, coa fin de identificar os efectos económicos específicos dunha expansión do turismo nun territorio de referencia, como é, no noso caso, Galicia.

Desenvolver as ferramentas, que podan ofrecer unha descrición detallada sobre os efectos macroeconómicos do modelo de turismo galego (tendo en conta tanto a oferta como a demanda turística), axudaría a toma de decisións de política económica dos axentes públicos e privados, con máis e mellor información sobre o seu funcionamento e as súas consecuencias.

Obxectivos

Como sinalamos anteriormente, o principal obxectivo desta investigación é proxectar e desenvolver modelos que permitan a análise dos efectos produtivos, distributivos e de benestar do turismo, tanto a nivel sectorial como a nivel dos fogares, para unha rexión como Galicia.

No primeiro caso, a nivel sectorial, a tese vaise concentrar na análise da capacidade da economía para atender á demanda do turismo a través da produción doméstica. É dicir, ata que punto a economía de destino (Galicia) se beneficia deste incremento de demanda externa coa xeración de produción interna ou se, pola contra, esta demanda turística é satisfeita por importacións de produtos (tamén coñecidas como “fugas” no proceso produtivo). No plano social, o obxectivo céntrase en mostrar se os efectos do turismo se distribúen uniformemente entre os fogares residentes ou se mesmo aparecen gañadores e perdedores no proceso de desenvolvemento do turismo.

Concretamente os obxectivos individuais de cada un dos capítulos serían:

Capítulo 01: No primeiro capítulo, preséntase un modelo Input-Output (IO) interrexional para estudar as interaccións espaciais entre Galicia e o resto de España derivadas do consumo turístico, para o período 2001-2007. Ademais, serve como punto de partida para o resto da tese coa estimación da contribución económica de tres tipos diferentes de consumo turístico (turismo receptor estranxeiro, turismo receptor nacional e turismo doméstico). Neste capítulo analízanse tamén os efectos *spillover*, algo que se presenta como crucial para economías pequenas e abertas (coma as rexións) onde as fugas produtivas son moi relevantes, como podería ser o caso de Galicia, no contexto español.

Capítulo 02: O obxectivo do segundo capítulo é presentar a primeira matriz de contabilidade social (SAM) para Galicia. Esta presenta unha gran variedade de familias (oito tipos distintos desagregados por nivel de renda), dous gobernos (o rexional e o central), catro tipos de impostos, e 29 sectores, con especial atención a aqueles que son relevantes para a avaliación de políticas turísticas. Para a súa elaboración é necesaria a integración de diferentes fontes de datos como poden ser: o marco IO galego do ano 2008 (MIOGA-08) publicado polo Instituto Galego de Estatística (IGE), a enquisa de orzamentos familiares (EPF) do Instituto Nacional de Estatística (INE) e a enquisa de condicións de vida das familias tamén do IGE, entre as máis importantes. Esta SAM, está construída coa finalidade de ser usada como base de datos dun modelo de Equilibrio Xeral Computable (CGE) e permítenos examinar non só o impacto sobre a produción, senón tamén os posibles efectos distributivos, ó ter en conta o mecanismo do fluxo circular da renda.

Capítulo 03: As vías en que o consumo turístico afecta á distribución da renda son principalmente tres: os cambios nos prezos, os ingresos dos fogares e, por último, os ingresos do goberno. Neste terceiro capítulo, enfocamos a nosa análise sobre as últimas dúas canles a través dun modelo que sae de forma directa da matriz de contabilidade social de Galicia para o ano 2008 (un modelo que serve como extensión do IO e que aplica as mesmas formas funcionais ca este). A través dos métodos de descomposición multiplicativa e aditiva dos multiplicadores contables, afóndase nos consecuentes efectos distributivos do consumo turístico receptor.

Capítulo 04: Cando os fogares de renda máis baixa non se ven involucrados nas actividades turísticas (xa sexa de forma activa ou pasiva), estas actividades van axudar a facer máis profundas as desigualdades económicas e vai aumentar a fenda entre os que teñen acceso ó capital (tanto físico como humano) e os que están no limiar da subsistencia. Máis aínda, a forma máis correcta de determinar o grao de participación da poboación de baixa renda non é a través de medidas de renda dispoñible, senón dende o punto de vista do benestar. Isto ten en conta non só os ingresos obtidos a partir da existencia do turismo, senón tamén o acceso a produtos turísticos e a súa posterior utilidade xerada. Polo tanto, o principal obxectivo deste cuarto capítulo é o de calcular como un incremento do consumo turístico afecta ó benestar das familias residentes desagregadas por nivel de renda, utilizando un modelo CGE rexional estático, calibrado coa SAM galega do 2008, elaborada no capítulo 2. Ademais, preséntanse tamén os resultados obtidos para catro simulacións sobre un incremento no tipo impositivo do imposto ó valor engadido (IVE) dos dous principais produtos turísticos: os servizo de aloxamento e os de restauración.

Conclusións xerais: Ó final da tese, preséntanse as principais conclusións alcanzadas a través da mesma, as súas principais contribucións á literatura existente e as posibles liñas de investigación e de traballo futuro que se abren a partir desta investigación.

Principais resultados

Na seguinte sección imos a presentar, de forma resumida, os principais resultados que se alcanzaron na presente tese. Desta forma, exporanse as conclusións máis salientables mediante a resposta ás distintas preguntas que nos motivaron a comezar a investigación.

As primeiras cuestións que debemos contestar para situar o contexto da nosa investigación son: que é exactamente o turismo? Que particularidades presenta o turismo en Galicia?

Tal e como se explica na introdución, seguindo as Recomendacións Internacionais para a Estatística do Turismo (IRTS) do ano 2008 (UNWTO, 2010), o concepto de turismo debe ser definido como un conxunto de actividades (sociais, culturais e económicas) relacionadas co movemento de persoas a lugares fóra do seu lugar de residencia habitual (e que son denominadas como visitantes). Así, afástase dos termos típicos cos que se considera ó turismo (turismo estival de sol e praia ou visitas a lugares con especial

atractivo), incluíndo outros tipos de desprazamentos, como aqueles feitos por motivos de negocios ou outros motivos persoais (como poden ser visitar a familiares ou amigos). Dito doutra maneira, o que converte un ben ou servizo nun produto turístico ou non é o tipo de consumidor que o está a adquirir.

No caso de Galicia, hai que sinalar que o turismo non presenta as mesmas características coas que se identifica ó conxunto do turismo en España e que ten algunhas particularidades especiais. Partindo da información proporcionada polo Instituto de Estudios Turísticos (IET) e pola enquisa de ocupación hoteleira (EOH) elaborada polo INE, temos en conta tanto as características da demanda como da oferta turística. Comparando a Galicia coas restantes rexións españolas, vemos que estamos a falar dun tipo de turismo especializado en turismo receptor nacional e cun gran número de establecementos hoteleiros pero de moi pequeno tamaño (con 5 empregados de media e aproximadamente 40 camas por establecemento).

En segundo lugar: como podemos medir a importancia que o turismo ten sobre unha economía? Debe ser esta análise diferente cando falamos de economías pequenas e abertas como as rexións?

Como non é posible identificar o turismo como un único sector dentro do sistema de contabilidade nacional, non podemos calcular directamente a súa relevancia para unha economía. Por esta razón, para medir a contribución económica e o impacto do turismo foron desenvolvidos diversos instrumentos macroeconómicos dende os anos 80 e 90 principalmente. Entre eles, o modelo máis usado neste tipo de estudos é o IO. Este é un modelo multisectorial que recolle non só os efectos directos sobre o sistema produtivo senón tamén os indirectos (e inducidos, se cerramos o modelo polo lado dos fogares).

Ó longo de toda a tese, os resultados indican que en termos de desenvolvemento, unha expansión do turismo ten un impacto positivo na xeración de ingresos e emprego do territorio en cuestión. Hai que sinalar tamén que a intensidade deste efecto positivo pode ser diferente entre as economías debido a dous efectos principais: 1) a interdependencia sectorial, é dicir, os vínculos económicos entre os produtos turísticos e os restantes produtos da economía e 2) a dependencia comercial que teña esa economía con outras economías (canto menor é unha economía, maior é a cantidade de bens importados que debe facer e, polo tanto, a súa dependencia co exterior). Mentres que no primeiro caso, canto maior é esta interrelación, maior vai a ser o impacto económico positivo. No

segundo caso, canto maior sexa a dependencia co exterior, maiores serán as "fugas" no proceso produtivo e menor o efecto positivo nesa economía (en termos de produción doméstica).

E polo tanto, posteriormente preguntámonos: cales son os efectos que ten o turismo sobre a estrutura produtiva galega? E sobre o mercado de traballo?

Os resultados obtidos no capítulo 1, suxiren que o consumo turístico representa en Galicia o 4,1% da produción doméstica, o 4,7% do Valor Engadido Bruto (VEB) e o 4,1% do emprego (é dicir, 47.286 postos de traballo a tempo completo) para o ano 2007. Para o resto do estado español, os resultados duplican a contribución económica dos de Galicia (8,4% da produción doméstica, 8,7% do VEB e 8,1% do emprego total, ou o que é o mesmo 1.453.775 postos de traballo a tempo completo).

Con todo, a evolución destas cifras macroeconómicas para Galicia durante o período 2001-2007 non é constante. De feito, podemos distinguir dous períodos diferentes: un crecemento continuo ata o Xacobeo 2004 (ate acadar o 5,0% da produción doméstica, o 5,5% do VEB e o 4,6% do emprego, que representarían 48.877 postos de traballo a tempo completo) e unha caída despois dese ano. Esta evolución está provocada, sobre todo, pola propia evolución do consumo turístico receptor nacional (que ven do resto de España) e que conforman o principal tipo de visitante (representando aproximadamente o 60% do consumo turístico total) .

Ademais, a análise realizada nesta tese pon de manifesto importantes efectos *spillover* importantes que amosan as asimetrías económicas entre Galicia e o resto de España. Como cabería esperar, a estrutura produtiva galega necesita importar máis produtos para satisfacer a súa demanda turística (0,30€ de produción doméstica por cada euro de demanda final) do que o resto do país precisa de produtos galegos (0,013€). Consecuentemente, isto quere dicir que a estrutura produtiva de Galicia pode ser considerada como non especializada na cadea de produción de bens e servizos demandados polos visitantes, dentro do contexto español.

Se nos fixamos nos resultados para o mercado laboral obtidos no capítulo 3, estes revelan que os asalariados de cualificación media e o excedente bruto de explotación/rendas mixtas brutas (ingresos por capital e autónomos) son os máis dependentes do turismo receptor. Máis aínda, os resultados suxiren que as rendas por

conta propia desempeñan un papel máis importante que os salarios por conta allea, na obtención de ingresos por parte dos fogares. Esta é unha consecuencia directa do tipo de turismo existente en Galicia. Como vimos anteriormente, Galicia presenta un elevado número de establecementos aínda que dun tamaño reducido (cunha alta porcentaxe, polo tanto, de traballadores por conta propia).

Directamente cabe preguntarse entonces: cales son os principais efectos sobre os fogares? Provoca o turismo fogares gañadores e perdedores?

A pesar de que si que existe unha corrente que identifica ós efectos do turismo como favorecedores para do alivio da pobreza e a redución das desigualdades económicas (Ashley *et al*., 2001; Mensah e Amuquandoh, 2010), a literatura que se centra nos efectos distributivos do turismo considerando o mecanismo do fluxo circular da renda atopa outro tipo de evidencias empíricas. Incluso a Organización Mundial do Turismo (UNWTO), considera que é habitual que os segmentos máis pobres da poboación dos países en desenvolvemento non se vexan beneficiados do impacto económico do turismo (UNWTO, 2005).

Wattanakuljarus e Coxhead (2008) presentan os resultados obtidos cun modelo CGE para Tailandia, revelando que aínda que o crecemento do turismo resulta beneficioso para todas as clases de familias, os maiores beneficios son recibidos polos fogares de renda alta e os non agrícolas. Coa mesma metodoloxía, Blake *et al*. (2008), atopan para Brasil resultados semellantes. Por último, Blake (2008) presenta un estudio dos efectos do turismo para tres países da rexión da África Oriental (Kenya, Tanzania e Uganda) a través de modelos baseados nas SAMs. Nestes países os fogares de renda máis baixa tamén se ven menos beneficiados polo turismo que a media.

Para o caso de Galicia, non poderíamos esperar nada a priori. Os anteriores traballos empíricos están realizados para países e non rexións e, ademais, todos eles considerados como economías en desenvolvemento. No capítulo 3, presentamos unha análise dos efectos distributivos do turismo receptor a partir dun modelo SAM de multiplicadores contables.

Aínda que, non se aprecian moitas diferenzas entre os resultados para os fogares por nivel de renda, é certo que as familias de renda máis alta reciben máis ingresos relacionados co turismo que as familias de renda baixa (5,78% e 5,74% respectivamente). Noutras

palabras, o efecto redistributivo dos gobernos debido ó sistema impositivo e de transferencias sociais (que aumentan os ingresos de familias de renda máis baixa) non compensan ós ingresos obtidos polo proceso produtivo (que beneficia máis as familias máis ricas), aumentando lixeiramente a desigualdade económica.

Como se ve afectado o benestar dos fogares residentes ante unha expansión turística?

En termos de efectos sobre o benestar dos fogares, os resultados van na liña do anteriormente obtido pola literatura específica. Coma nos estudos de Wattanakuljarus e Coxhead (2008) e Blake *et al*. (2008), os resultados indicaron que unha expansión do turismo receptor aumentaría o benestar social de Galicia. Con todo, para todas as simulacións presentadas as familias de renda máis alta tenden a beneficiarse máis que os fogares de renda baixa.

E, por último: cal sería o impacto de aumentar o IVE dos principais produtos turísticos en Galicia?

Cando falamos de impostos a produtos turísticos debemos de pensar que o goberno posúe certo poder de monopolio nese mercado, e que este pode ser usado para extraer ingresos por esta vía. O grao de elasticidade da demanda vai depender principalmente do grao de diferenciación do destino e, polo tanto, a súa capacidade impositiva tamén dependerá do mesmo. Canto maior sexa o grado de diferenciación do destino, máis inelástica será a demanda e, entón, maior será a posibilidade de extraer ingresos por parte dos gobernos (Gooroochurn e Sinclair, 2003).

Así, Blake (2000) elabora un modelo CGE para analizar os efectos dun aumento dos impostos sobre o turismo estranxeiro en España. Neste traballo, os resultados mostran que ese incremento no tipo impositivo pode causar un aumento de benestar para os fogares residentes, xa que os visitantes estranxeiros son os que reciben a maior parte dos efectos negativos do imposto (suba dos prezos) e a consecuente diminución no benestar.

Gooroochurn e Sinclair (2005) presentan un estudo semellante para a economía de Mauricio, onde atopan tamén que facer tributar os visitantes non-residentes aumenta o benestar nacional. Outro resultado deste traballo é que o aumento dos impostos sobre os sectores relacionados co turismo tamén reduce a desigualdade de renda, xa que as familias máis ricas teñen unha maior propensión ó consumo de produtos turísticos que os de renda baixa.

Os resultados que obtemos no capítulo 4 a través dun modelo CGE revelan que no caso de Galicia un aumento do IVE nos produtos turísticos traduciríase nun impacto negativo sobre os sectores de servizos de aloxamento e restauración, como cabería esperar. Pero ademais, como os prezos destas actividades medran, o turismo noutras rexións ou países tórnase relativamente máis barato que visitar Galicia, reducíndose as exportacións e, en consecuencia, aumentando as importacións.

En termos de benestar os resultados indican que o incremento do tipo impositivo do IVE aumentaría a utilidade dos fogares de renda máis baixa, pero os de rendas medias e altas verían reducido o seu benestar. Podemos relacionar este resultado, co obtido no capítulo 2, onde se amosaban os diferentes patróns de consumo dos fogares. Así, as familias de baixa renda gastan unha maior porcentaxe relativa dos seus ingresos en produtos básicos, mentres que as familias de renda máis alta teñen unha porcentaxe relativamente maior de gastos en servizos de hostalería (aloxamento e restauración).

Polo tanto, este escenario fiscal diminuiría a desigualdade en termos de renda dispoñible, pero tamén o benestar social en xeral. Este resultado, contrario ós obtidos polos anteriores estudos, está relacionado coa importancia do turismo doméstico sobre o total, que representa aproximadamente un 30% para Galicia, e que previsiblemente é moito menor para os casos dos países en desenvolvemento analizados. Noutras palabras, podemos concluír a partir dos resultados obtidos que aumentar o tipo impositivo do IVE en aloxamento faría recaer con maior intensidade o efecto negativo sobre o turismo receptor (o que significa trasladar rendas dos non-residentes ás familias residentes a través dos gobernos) que no caso de facelo para os servizos de restauración, onde os consumidores residentes se verían máis afectados (tanto os intermedios como os finais).

Contribucións desta tese

Ata onde chega o noso coñecemento, nesta tese, hai diversas contribucións orixinais á investigación na temática. Por orde de capítulos, o capítulo inicial ofrece o primeiro artigo que amosa as interaccións comerciais debidas ó turismo entre unha economía pequena e aberta e o resto do país.

No segundo capítulo, elabórase a primeira SAM para Galicia. Case de forma simultánea, dende o Instituto de Estatística de Galicia (IGE) realizouse un esforzo preliminar na elaboración dunha SAM galega tamén para o mesmo ano 2008. De todas

formas, este intento do IGE, non se pode considerar unha SAM completa, senón unha matriz de destino de cinco sectores, estendida en factores produtivos por niveis de cualificación e sexo (IGE, 2013).

O terceiro capítulo presenta tamén o primeiro traballo sobre os efectos distributivos do consumo turístico para unha economía rexional. Ademais pódese incluír dentro da recente literatura sobre este tema (despois dos de Wattanakuljarus e Coxhead (2008), Blake *et al*. (2008) e Blake (2008)).

Finalmente, no último capítulo amósase unha primeira tentativa dun modelo CGE para Galicia. Pero tamén, é o primeiro modelo CGE con múltiples fogares residentes para poñer en relación o turismo e os seus efectos en termos de benestar para unha rexión e engade evidencia empírica sobre o impacto macroeconómico da imposición dos produtos turísticos (tras os artigos de Blake (2000) e Gooroochurn e Sinclair (2005)).

Liñas futuras de investigación

Finalmente, escribir unha tese é máis un primeiro paso que un punto final na carreira da investigación. De feito, a medida que a tese avanza, un entende que probablemente está abrindo máis cuestións para o futuro do que está a responder as preguntas que se estableceron no inicio. Así, tendo isto presente, nesta última sección do resumo, imos presentar algunhas posibles liñas de investigación para o futuro que teñen unha conexión directa cos temas tratados neste traballo.

Un dos primeiros puntos que xorden directamente desta investigación é a estimación dun modelo interrexional español de nove rexións. Como mencionamos anteriormente, en España existen varios tipos de turismo e con esta ferramenta de análise, poderíase comprobar se estas diferenzas en modelos turísticos se ven traducidas en diferenzas tamén nos impactos macroeconómicos derivados do consumo turístico. Ademais, a análise dos efectos *spillover* entre as rexións alcanzaría outra dimensión, dándonos información sobre a demanda turística que ten máis efectos sobre o resto das rexións españolas.

Outro tema para o futuro, respecto ó impacto económico do turismo, é considerar tamén os efectos ambientais como posibles impactos negativos. Calcular o impacto do turismo na economía supón estimar tamén os custos asociados ó mesmo. Por exemplo, para satisfacer o vector de demanda final turística necesitamos producir toda unha serie de

bens e servizos, e no transcurso desta produción obtemos non só eses produtos, senón tamén toda unha serie de residuos físicos que devolvemos á natureza. Así, unha externalidade importante (custes incidentais) é a que está relacionada coa degradación do medio ambiente e, consecuentemente, da calidade de vida.

Por último, sobre o tema de modelos CGE, hai varios puntos que se presentan como avances para o traballo futuro. O primeiro é aprender máis sobre os tipos de peche dos modelos e os seus efectos sobre os resultados obtidos. Ademais, un enfoque dinámico sería máis desexable para a especificación, a fin de corrixir o xeito en que o investimento e o aforro son introducidos no presente modelo estático. En relación a outras posibles aplicacións usando un modelo CGE, aparecen dous temas interesantes: o mercado de traballo e os efectos macroeconómicos da estacionalidade da demanda, e estimar o impacto doutros tipos de impostos turísticos relacionados coa cuestión da sostibilidade. Centrándose no primeiro tema, sería necesario modelizar o desemprego, considerando distintos tipos de traballadores (desagregados por tipos de contratos e niveis de cualificación, por exemplo). Para o segundo punto, o atractivo centraríase en avaliar o impacto económico e social de eco-taxas ou impostos pigouvianos e comprobar se, efectivamente, a súa aplicación corrixe as posibles externalidades negativas xeradas polas actividades e o consumo turístico.

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Introduction

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Tourism has been one of the economic activities with the highest growth rates worldwide in the last few decades, and it continues expanding even today despite the current economic situation. In this context, it is crucial to give concrete answers to what the positive and negative macroeconomic effects of tourism are on a regional economy like Galicia. Furthermore, it becomes essential to know its direct and indirect impact on the welfare of the whole society. The estimation and analysis of this through different economy-wide models is the central objective of the present thesis.

In this extensive introduction, we start by clearly defining the concept of tourism and its main indicators from an economic perspective. Then, we show the present situation of tourism in Galicia and the different regional characterizations tourism has within the Spanish context. In the next section, an introduction to the models used for the macroeconomic analysis of tourism is explained. Finally, we present the main motivations for working on this thesis, as well as the general objectives and the aims of each individual chapter.

1. Tourism as an economic phenomenon

1.1. Definition of tourism

Following the International Recommendations for Tourism Statistics (IRTS) for the year 2008 (UNWTO, 2010), the concept of tourism can be defined as the following:

"Tourism is a social, cultural and economic phenomenon related to the movement of people to places outside their usual place of residence, pleasure being the usual motivation."

This notion of activities covers all of visitors´ actions whether in preparation for a trip or while on a trip. It is not constrained to what are often considered "typical" tourism activities such as sightseeing, sunbathing, visiting landmarks, and practicing or watching sports. Additionally, it includes other types of displacements such as those made for business or other personal reasons.

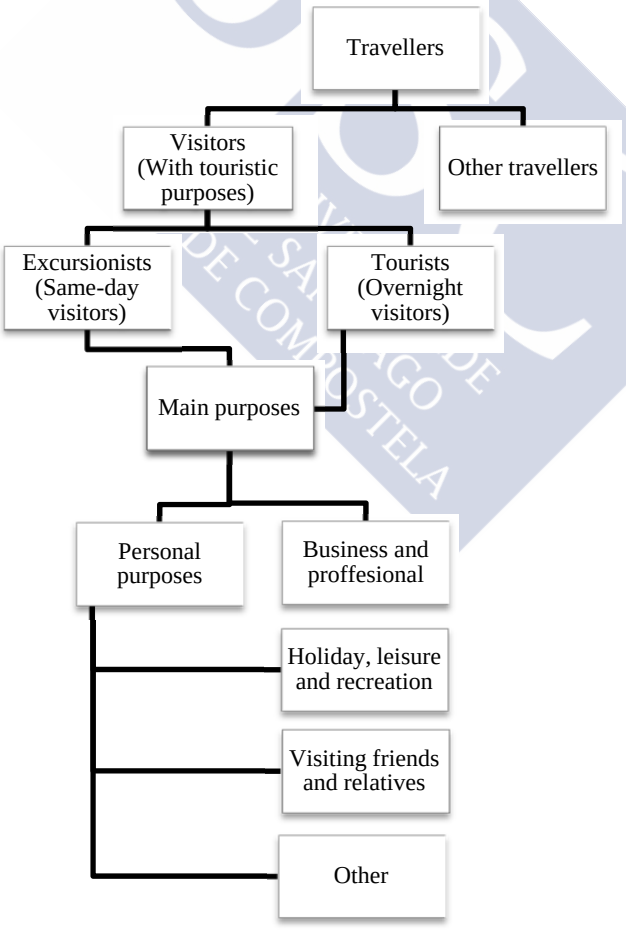
Moreover, it can be inferred that people who travel and take vacations within their usual environment are not tourists. The usual environment of an individual, a key concept in tourism, is defined as the geographical area within which an individual conducts his/her regular life routines, as indicated in the IRTS. Some countries use another particular

approach to delimit the "usual environment". For example, in United States and Canada it is defined as 50 miles (80 km) from the place of residence and in Australia within 25 miles (40 km).

1.2. Types of visitors

It must be noted that tourism is essentially referred to as the activity of visitors, i.e. a traveller with a touristic purpose. As Figure 1 shows, it can be divided into two different concepts: tourists and excursionists. A tourist is a temporary visitor in a country that remains at least 24 hours for personal or business purposes. On the other hand, an excursionist is also a temporary visitor but remains in a place less than 24 hours, without any overnight stay at the destination. It also includes cruise passengers and passengers of yachts or other private ships who sleep on the vessel.

Figure 1 – Types of visitors



Source: Own elaboration based on IRTS 2008 (UNWTO, 2010)

From the perspective of motivation for taking the trip, we can distinguish between visitors with personal reasons (which include holiday, leisure and recreation travels, visiting friends and relatives, education and training, health and medical care, religion or shopping, among others) and visitors with business purposes (which cover visitors that travel due to their profession, to attend conventions and conferences or to make purchases or sales, or any other activity related to their business). This distinction between purposes, and more specifically between business tourists and leisure tourists, is quite relevant for two reasons. Firstly, they are two different market segments, where the seasonal component of leisure tourism is much more relevant than in the business one. Secondly, while holiday visitors are more common than business visitors, the latter have higher average expenditures per day at the destination.

1.3. Tourism flows

The IRTS distinguishes between three basic tourism forms regarding the relationship between the country of residence and the destination of the visitor: domestic tourism, outbound tourism and inbound tourism. As can be seen in Figure 2, domestic tourism comprises the activities of a resident visitor within the country or region of reference. Inbound tourism refers to the activities carried out by non-residents within the country or region of reference. Finally, the activities of a resident visitor outside the country of reference are considered outbound tourism.

Figure 2 - Tourism flows

		Destination territory		
		Inside the same economic territory	Outside the economic territory	TOTAL
Residential territory	Resident	**DOMESTIC TOURISM**	**OUTBOUND TOURISM**	*NATIONAL TOURISM*
	Non residents	**INBOUND TOURISM**		
	TOTAL	*INTERNAL TOURISM*		

Source: Own elaboration based on IRTS 2008 (UNWTO, 2010).

These aforementioned forms of tourism can be combined in different ways in order to show three new categories of tourism: internal tourism, which includes domestic

tourism and inbound tourism; national tourism, including domestic tourism and outbound tourism; and international tourism, which is the sum of inbound tourism and outbound tourism.

2. Evolution of the main variables: Galicia in the Spanish context

Once we have specified what tourism is and its main forms, in the next section, we will present the implications of tourism in Galicia, trying to determine the kind of tourism this region has within the Spanish context in a descriptive way. As a demand-side phenomenon, tourism must be approached by analyzing the activities of visitors and their acquisition of those goods and services. However, it can also be viewed from the supply side, and then it will be understood as a set of activities that are produced mainly for visitors or for which an important share of the main output is consumed by visitors (UNWTO, 2010). Both approaches are going to be used in this section by showing the evolution of their respective key variables.

2.1. Tourism demand

As Dwyer *et al.* (2010) explain, tourism demand refers to the willingness and ability of visitors to buy a tourism product or, in national accounting terms, the total amount of expenditures made by visitors. Factors that influence the level of tourism demand are usually divided into price factors (the cost of transport services and the cost of ground content (accommodation, food and beverage, entertainment, etc.)) and non-price factors (weather conditions, amenities, quality of tourist services, etc.). This total amount of visitors' expenditures can be broken down into three main variables: the multiplication of tourism arrivals, average expenditure per day and length of stay.

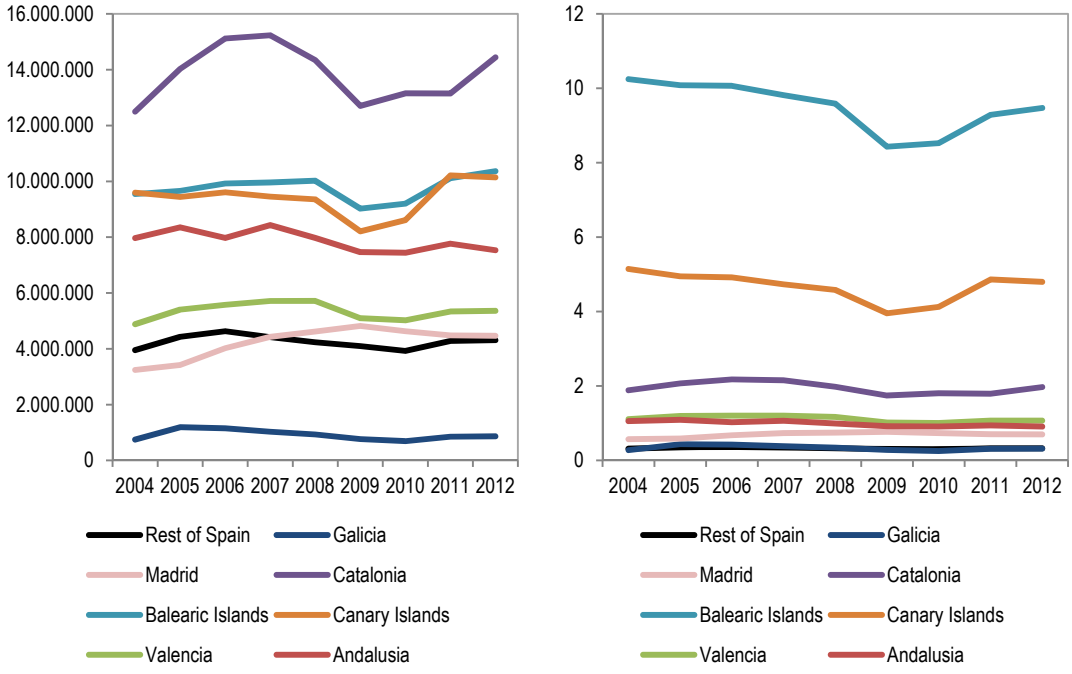
Evolution graphs for the six most touristic regions in Spain, considered by the Spanish Tourism Studies Institute (IET), and additionally Galicia and the rest of Spain are presented. We separate inbound tourism into two groups (foreign inbound tourism and national inbound tourism) in order to try to summarize their behaviour from 2004 to 2012, when possible.

Foreign inbound tourism

Using data from IET (FRONTUR database), Figure 3 shows the total foreign inbound arrivals and the foreign tourism intensity ratio (TIR) (the number of visitor arrivals per resident). This ratio has the advantage of accurately defining the real capacity of the tourism market and is the most common measure of tourism´s socio-cultural impact (Pérez-Dacal *et al*., 2013; McElroy and De Alburqueque, 1998).

As can be seen, Catalonia, both major island groups and Andalusia are the regions that receive the most international visitors, which remains constant over time. Taking into account the population of the destination region, the foreign TIR shows us that the island groups are ranked as the top two in international arrivals intensity by far. On the other hand, Galicia appears at the bottom in both variables.

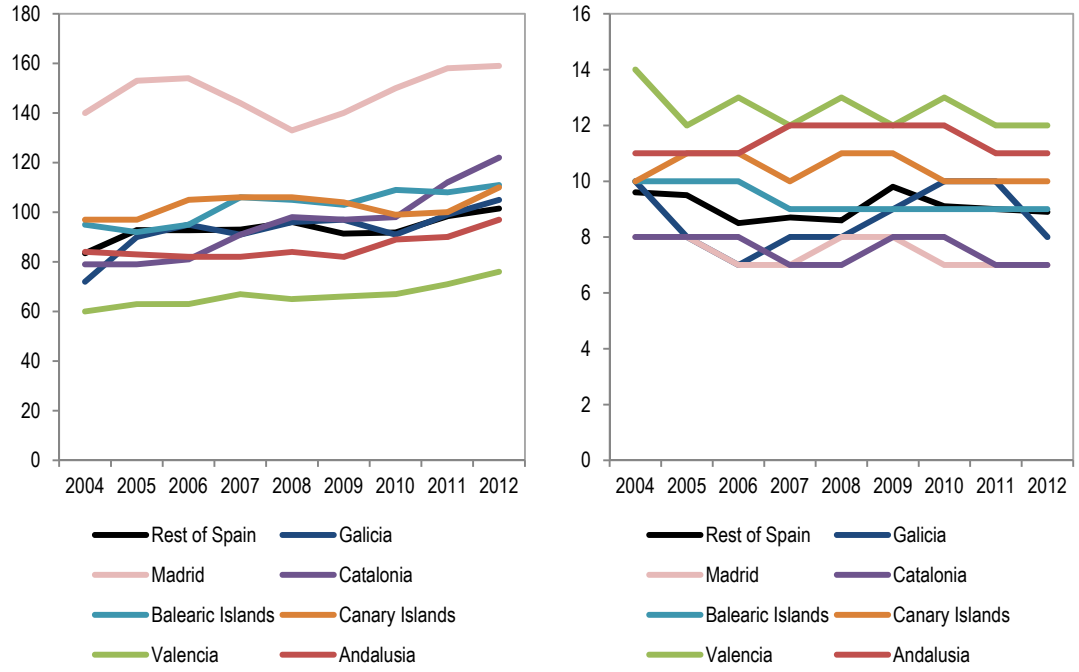
Figure 3 – Foreign inbound tourism arrivals and foreign inbound tourism intensity ratio



Source: Own elaboration from data of FRONTUR (IET).

Regarding the average expenditure per day in Figure 4, Madrid stands out over the entire period, with visitors spending around 150€ per day while Valencia presents the lowest results at around 70€ per day. Galicia and the rest of the Spanish regions have similar values, starting the period with a daily average of 72€ in 2004 and ending with 105€.

Figure 4 - Average expenditure per day and length of stay of foreign inbound tourism



Source: Own elaboration from data of FRONTUR and EGATUR (IET).

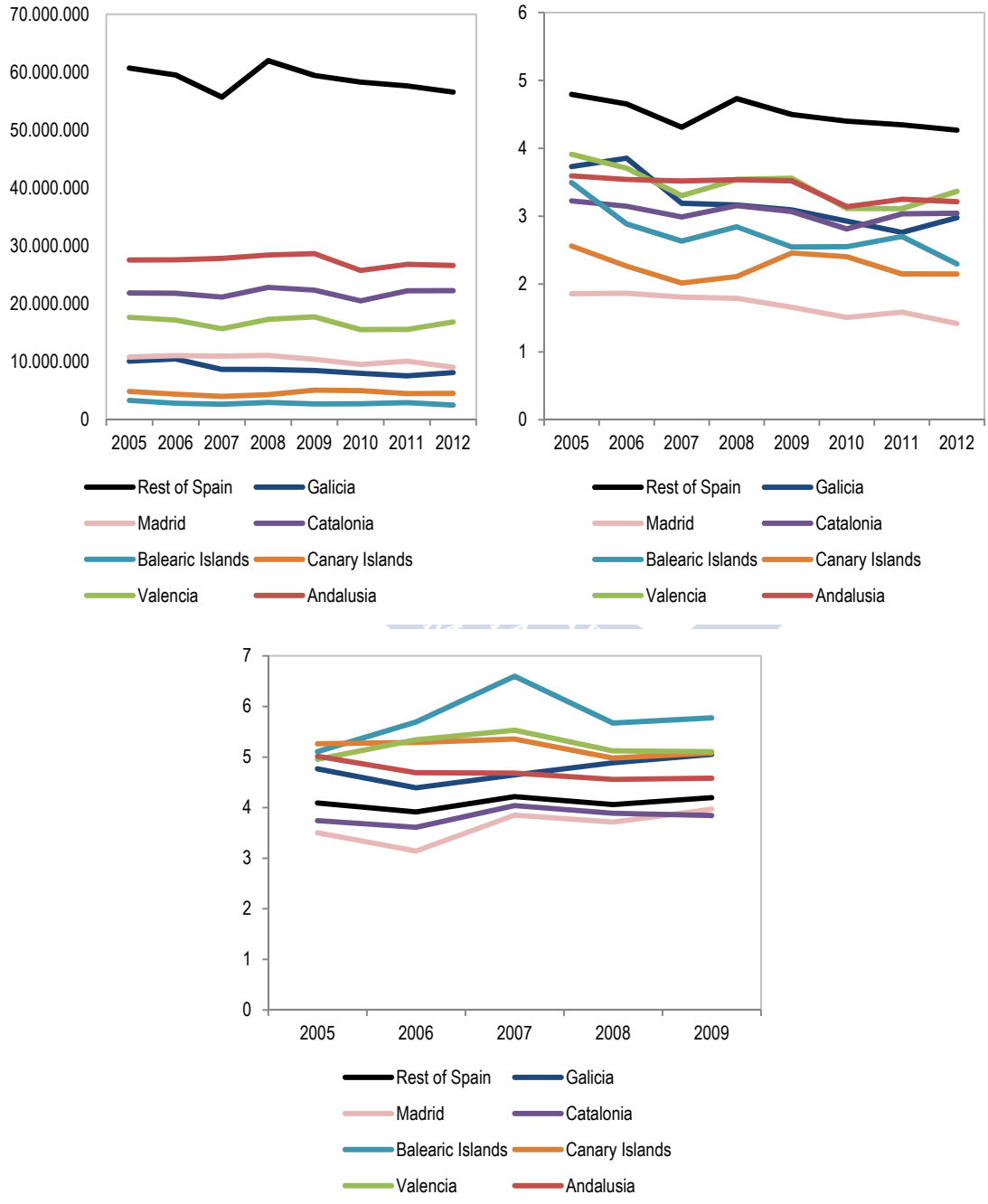
Nevertheless, in terms of length of stay, Valencia and Andalusia are the top two regions with foreign visits lasting over 12 days on average. On the contrary, Madrid and Catalonia, the regions with the most important international airports in Spain, present the lowest lengths of stay by foreign visitors. In Galicia, the average length of stay during this period is around 9 days.

National inbound tourism

A different pattern can be seen regarding national inbound tourism, as Figure 5 shows, using available data from IET (FAMILITUR). Contrary to the results obtained for foreign visitors, the rest of Spain (especially Castile and Leon and Castile - La Mancha, due to its proximity to Madrid), Andalusia, Catalonia and Valencia appear to be the regions that receive the most national inbound visitors. The national TIR reveals that the rest of Spain, Andalusia and Valencia present the highest intensity of national visitors compared to the resident population. It is interesting to note that the two island territories appear at the bottom in those two variables.

The Balearic Islands, the Canary Islands and Valencia have the longest length of stay for this touristic profile. Again, Madrid and Catalonia present the shortest stays. Focusing on the Galician results, we can see that it appears among the top regions in intensity of arrivals (with values similar to Andalusia, Valencia or Catalonia) and also in length of stay, reaching an average of five days at the end of the available period.

Figure 5 - National inbound tourism arrivals, national inbound tourism intensity ratio and length of stay



Source: Own elaboration from data of FAMILITUR (IET).

2.2. Tourism supply

Unlike other industries that produce goods or services, tourism is not a sector. Normally, sectors are classified according to the goods and services that they produce. However, in the case of tourism, the defining element is not the type of commodity produced, but rather the type of consumer (Dwyer *et al*., 2010). Therefore, following the recommendations of the Spanish Tourism Satellite Account (STSA), in Table 1, the main activities characteristic of tourism and their tourism ratio are presented, i.e. the percentage of production of tourism characteristic products over total production.

Table 1 – Tourism characteristic activities and their tourism production ratio for Spain (year 2004)

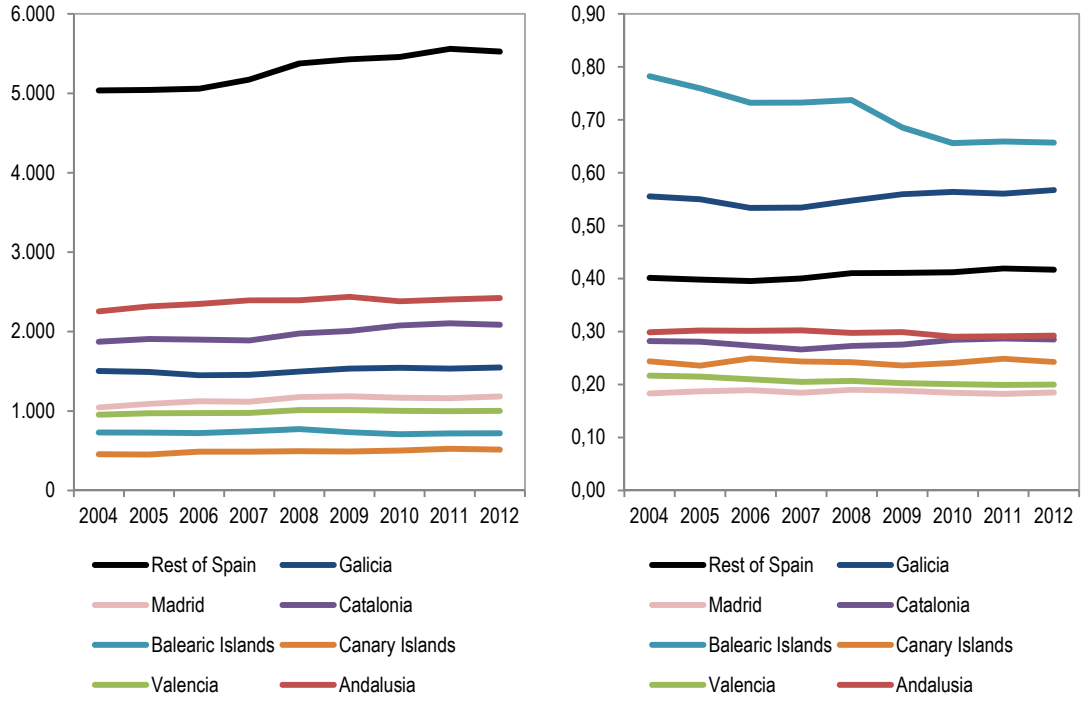
	Total production	Production of tourism characteristic products	Tourism ratio
Accommodation services	111397	27746	24,91%
· Hotels and similars	19078	17900	93,83%
· Real estate rental services	92319	9846	10,66%
Restaurants services and similars	78409	21487	27,40%
Transport of passengers	18848	11282	59,86%
· By train	7830	2315	29,57%
· By bus or car	2577	1463	56,79%
· By ship	576	430	74,68%
· By plane	7865	7073	89,93%
Travel agencies services	4030	4005	99,37%
Other transport services	26154	3219	12,31%
Transport rental services	3182	1254	39,40%
Sports and cultural services	34868	2206	6,33%
Total characteristic activities	**276888**	**71198**	**25,71%**
Total non-characteristic activities	1335258	14606	1,09%
Total	**1612146**	**85804**	**5,32%**

Source: Own elaboration from data of STSA (INE).

To simplify our descriptive analysis of this section, we are going to focus our attention on the activities of "Hotels and similar establishments" since they are the most representative sector (with a tourism ratio over 90% and an important share of the total tourism characteristic production). ´Hotels and similar establishments´ are considered to be those entities that offer accommodation services for a certain price such as hotels, apart-hotels, hostels, etc. Using information from the Hotel Occupation Survey (HOS) we present the evolution of variables that measures the number of establishments and their density, the size of the establishments by number of beds and beds per establishments, as well as employment and the employees per establishment, for the period 2004-2012.

As Figure 6 shows, Andalusia, Catalonia and the rest of Spain are the regions with the highest number of establishments. Regarding establishment density, measured as number of establishments per 1,000 inhabitants, the Balearic Islands and Galicia stand out with more than one establishment per 2,000 residents in the region. On the other hand, the Canary Islands, Valencia and Madrid appear at the bottom in both variables.

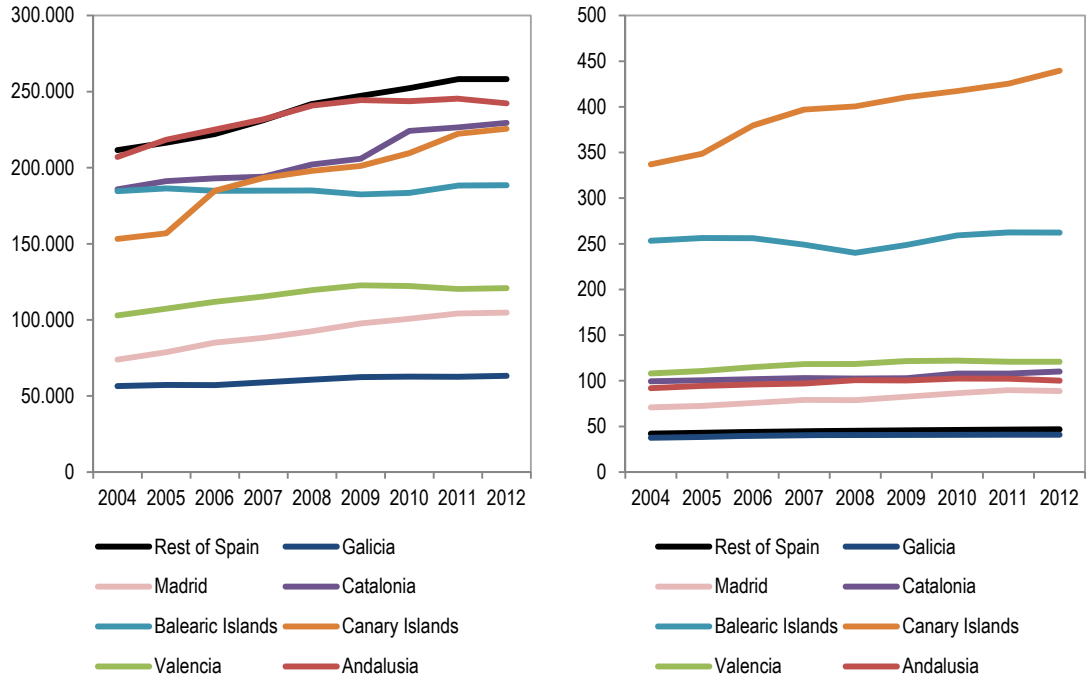
Figure 6 - Number of establishments and establishment density



Source: Own elaboration from data of HOS (INE).

In terms of number of beds, the evolution shows a clear positive trend in all regions (more constant for the Balearic Islands and Galicia), with Andalusia, Catalonia and the Canary Islands being the ones with highest bed capacities, Figure 7. If we take into account the number of establishments, in order to measure the relative size of each hotel or similar establishment, we observe that the Canary Islands and the Balearic Islands have the biggest establishments for accommodation services. On the contrary, Galicia and the rest of Spain appear as having relatively small hotels with around 40 beds per establishment on average.

Figure 7 - Number of beds and beds per establishment

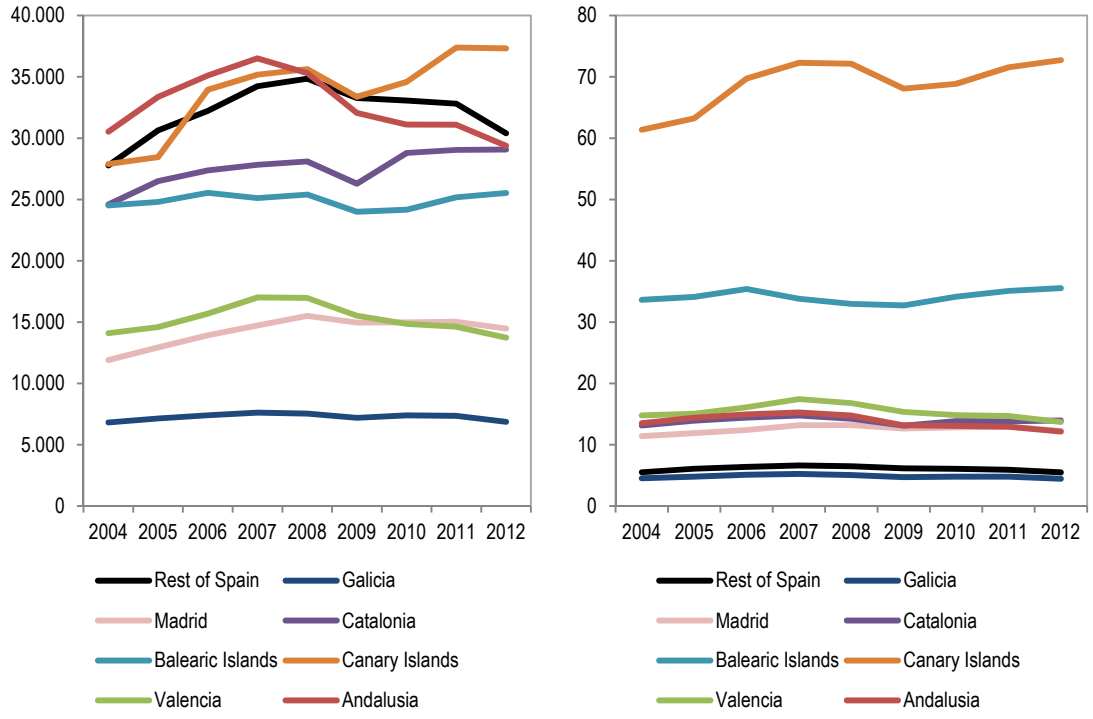


Source: Own elaboration from data of HOS (INE).

Finally, employment in the accommodation sector has experienced varying evolutions depending on the region, Figure 8. There are those, such as Andalusia and Valencia, which present a decrease in the number of employees, especially after the start of the economic crisis in 2008. However, others, like the Canary Islands and Catalonia, have increased employment in the hotel sector over the entire period.

Another way of measuring the average size of the hotels and similar establishments is by using the employees per establishment variable. The results agree with those obtained with the beds per establishment measure. Again, the Canary Islands and the Balearic Islands have the biggest hotels, with around 70 employees and more than 30 employees per establishment respectively. Galicia and the rest of Spain present the smallest establishments of all the regions considered, with five employees in the former case and six in the latter.

Figure 8 - Employment in the accommodation sector and employees per establishment



Source: Own elaboration from data of HOS (INE).

2.3. Types of tourism in each region within the Spanish context

If we combine all of these supply and demand variables and compare them to each average value for the whole of Spain, we get a summary of the different types of tourism for each of the eight regions considered, Figure 9. We select four demand variables (foreign TIR, daily average expenditure (DAE) of foreign visitors, length of stay of the foreign and national TIR) and another four supply variables (beds density, employees per establishment, establishment density and the employment location quotient (ELQ, an index that compares the percentage of employment in the hotel sector over total employment in the region to the respective Spanish percentage)).

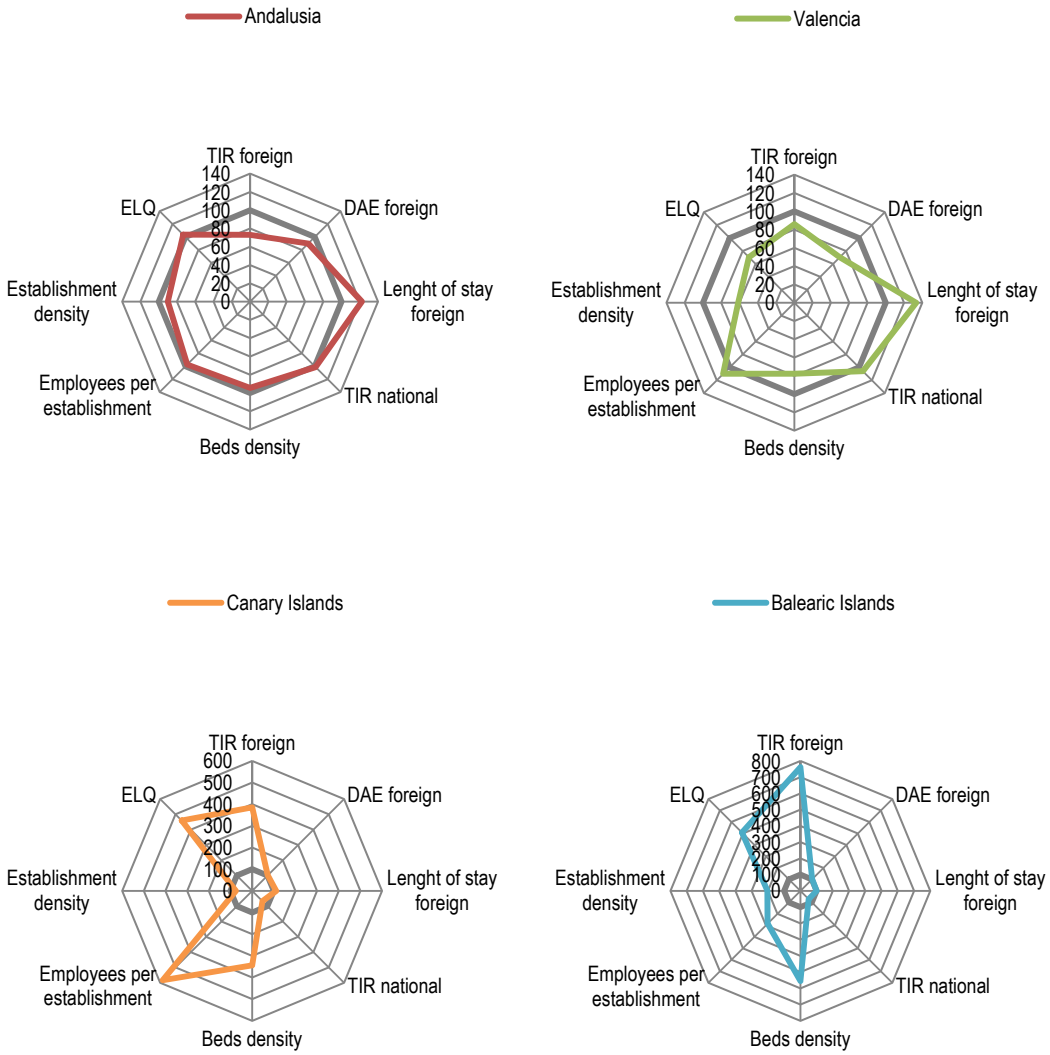
Given that, Andalusia and Valencia present a type of tourism based more on national visitors, longer length of stays and not as high average expenditures per day.

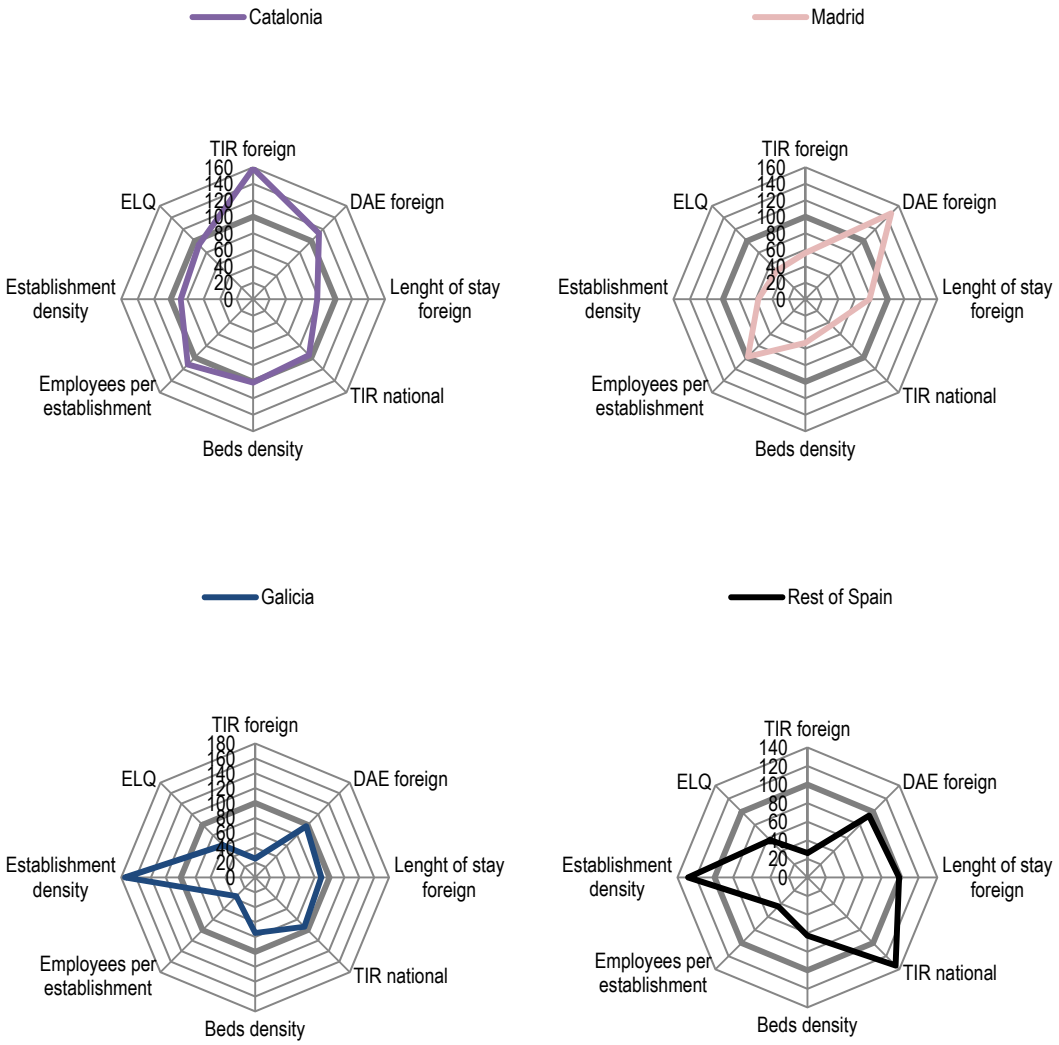
Both the Canary Islands and the Balearic Islands have extraordinary levels of intensity in foreign arrivals, employment, beds density and size of the establishments measured by the employees per establishment variable. However, the levels of intensity of national visitors are much lower.

Regarding Catalonia and Madrid, both present higher average expenditures per day but shorter length of stays. This is connected to having the main Spanish metropolises (Barcelona and Madrid) and thereby attracting more business tourism. Catalonia also has a high intensity of foreign visitors. On the contrary, Madrid presents below average values for the rest of the variables, except for the size of the establishments.

Finally, Galicia and the rest of Spain are specialized in national inbound tourism and present a high number of establishments but of a smaller size.

Figure 9 – Types of tourism in each region with respect to Spain = 100 (year 2012)





3. The macroeconomic analysis of tourism

Since it is not possible to identify tourism as a single sector in the national accounting system, its significance for an economy cannot be directly calculated (Dwyer *et al.*, 2010). For this reason, in order to measure the economic contribution, impact and benefits of tourism several macroeconomic tools have been developed. In this section, we are going to briefly describe the main ones: Tourism Satellite Accounts (TSA), Input-Output models (IO), Social Accounting Matrices (SAM) and Computable General Equilibrium models (CGE).

3.1. TSA

The TSA is a method recently developed to measure the direct economic contribution of tourism consumption in an economy. It is based on the principles and structure of the System of National Accounts (SNA) through the Supply and Use Tables (SUT) of the IO framework, among other sources.

The interrelated tables show the size and distribution of the different types of tourism consumption in terms of GDP, employment or other macroeconomic variables (Frechtling, 2011). Therefore, it allows us to identify the real concept of tourism following what IRTS described before.

However, TSA is not able to consider secondary effects on an economy. These include, firstly, indirect effects related to interindustry transactions and consequently the possible leakages of the production process. And secondly, subsequently induced effects are not taken into account. Estimating these effects would require introducing and implementing economy-wide models, based on a general equilibrium system.

3.2. IO models

Input-output was the name given to the analytical framework developed by W. Leontief and presented in 1936 in “Quantitative Input-Output Economics Relations in the Economic System of the United States”. It is defined as an accounting framework that presents the interdependence of the production structure and allows us to implement simulation and prediction models, such as the demand model, most traditionally. The essential premise is to consider that an economy can be divided into homogeneous industries with mutual and stable relationships over time, expressed through "technical coefficients".

As shown in “The Structure of American Economy 1919-1939”, Leontief´s initial objective was to conduct a study on the interrelationships between different parts of an economy. Thus, more specifically, the process is made to simplify the Walrasian scheme of general equilibrium, by first aggregating the products so each sector offers one output, and then by adopting the linear form for the production equations. Therefore, designing an economy separated into n sectors, where the level of output in each sector will depend on the level of the others (Dorfman, 1954).

As a result, by knowing the final demand for a determined moment in time we obtain the value of output required for each industry to satisfy it. In other words, it can be used to examine how production changes in response to a change in final demand.

The essence of the multipliers is the difference between the initial effect of the change in final demand and the full effects of this change (Miller and Blair, 2009). These total effects can be set in two ways: as the sum of direct and indirect effects (through the Leontief Inverse open for the income of households) or as the sum of direct, indirect and induced effects (through the Leontief Inverse as well, but closed for the incomes of households and its consumption). Literature tends to call for the first simple multiplier and the second total multiplier. The idea behind the effect types of the multiplier can simply be expressed with a power series approximation as follows:

$$(\boldsymbol{I} - \boldsymbol{A})^{-1} = \boldsymbol{I} + \boldsymbol{A} + \boldsymbol{A}^{2} + \boldsymbol{A}^{3} + \boldsymbol{A}^{4} + \cdots$$

The *direct effects* are those that appear in the early progression of technical coefficients, in particular by adding the initial effect (I) and the multiplier effect that comes from the matrix A, i.e. the amount of product in each sector that is "directly" required for another industry to produce its own product. In the case of measuring the contribution of tourism, the magnitude of this impact will be directly related to the number of tourists and the amount of expenditures they make, which is final demand.

Instead, the *indirect effects* are obtained by adding the values of the remaining progression to infinity. In other words, we should consider the effects on the intermediate demand, that is, the amount of input that the tourism industry needs to carry out its production. The magnitude for a territory will depend on the existence and importance of "leakages" and "gains" of the production process, whether from trade or use of non-resident workers.

In addition, some *income effects* also appear, if in the closed household model, due to the wages received by resident workers. This causes a new round of positive impact on the economy, the induced effects.

A similar interpretation can be made from other multipliers calculated based on employment or revenues from productive factors.

As in the case of TSA, the Leontief IO model also has its limitations. The most traditional ones are that there is no assumption of supply constraints (even workers), a constant return to scale, a fixed commodity input structure or homogeneous sector output (Hara, 2008; Miller and Blair, 2009). Additionally, IO models do not provide details about the economic structure below the interindustry level. If we want to estimate the impact of a change in tourism demand over types of workers, different households or governments, it is necessary to use a SAM model (which is essentially an extension of the IO model).

3.3. SAM models

The aim of a SAM is to describe the macroeconomic scheme called "circular flow of income" for a specific economy (Stone, 1961). This is a structural system that represents the economy as a whole, which covers agents or institutional sectors and financial transactions that take place between them.

Table 2 shows a simplified representation of a SAM considering four different institutional agents (consumers, producers, financial sector and the foreign sector) and its resulting relationships.

Table 2 - Structure of a simplified SAM

	Production Account	Consumption Account	Investment/saving Account	Foreign account	Total
Production Account		***F***	***I***	***X***	Demand
Consumption Account	***Y***				Income
Investment/saving Account		***DS***		***FS***	Savings
Foreign account	***M***				Foreign Payments
Total	Supply	Expenditure	Investment	Foreign revenues	

This economy-wide framework is based mainly on the accounting identity rule, which implies that total revenues must be equal to total expenditures for each account. Therefore, in the first account, it is shown that the aggregate demand (***F*** + ***I*** + ***X***) must be equal to the aggregate supply (***Y*** + ***M***), i.e. total resources in the economy are equal to total uses. In the

second account, total disposable income of the institutional agents (***Y***) equals their total expenses plus their savings (or future expenses) (***F*** + ***DS***). Then, in the third, total investment (***I***) is equal to total domestic savings and foreign savings (resources provided by the rest of the world to the economy of reference) (***DS*** + ***FS***). Finally, the revenues obtained from the transactions with the rest of the world (***X*** + ***FS***) equals their payments (***M***).

The limitations related to SAM models are the same that appear in IO modelling since both are quantity linear models based on Leontief´s complementary functions. In addition, the data requirements make it more costly than IO models.

3.4. CGE models

A CGE model can be defined as a set of macroeconomic equations that describe the economy as a whole, considering the basic microeconomic interactions between its institutional agents as well. Thus, these equations relate the microeconomic theoretical foundations with the standard macroeconomic one. In these kind of models equilibrium is achieved with simultaneous adjustments in prices and quantities (making it a much more realistic model). In this sense, CGE models are designed to serve for empirical analysis and evaluation of economic policies.

The structure of a CGE model is defined by its main database: the SAM. Thus, relating it to that which has already been explained, a CGE model describes the circular flow of income but considers the price mechanism and the possible substitution between consumption and factors derived from the elasticities.

CGE models have been applied to numerous topics (Hosoe *et al*., 2010) such as:

- Macroeconomic issues in general: budget reductions in public expenditures, the impact of tax reforms on income distribution, poverty reduction, etc.
- Fiscal policy issues: the effects of the introduction of new taxes, subsidies for industries, etc.
- International trade: the effects of monetary integration, reductions of tariffs, food prices, etc.
- Environmental policies: green-taxes, pollution or waste policies, etc.
- Labor market issues: minimum wage reduction, social contribution policies, etc.

4. Motivation and objectives of this thesis

Among economic activities, the growth rate of tourism has been extraordinarily high in recent decades for most regions in Spain. In some aspects, tourism has achieved success by creating increases in income and greater job opportunities for residents, as well as significant benefits from the point of view of recovering historical and natural heritage (through the declaration of national parks, for example), rehabilitation of buildings and historic sites or establishing quality standards in tourist areas. Without a doubt, tourism is an activity that plays an important role in the growth strategy of an economy, and it has strong partial effects on production, employment, the foreign sector, the public sector, stability of prices, territorial redistribution of income or land use. However, these effects cannot always be assessed as positive. In addition, tourism has evident externalities on the environment and the social and territorial structures, and therefore on their future economic sustainability.

From an economic perspective, it is clear that tourism development modifies relative prices (Dwyer *et al.*, 2004), and thus, several derived direct effects on resource allocation, as well as indirect effects on economic production patterns which can result in significant changes in the productive structure. In addition, tourism expansion can have substantial impact on the income distribution at an individual level (due to its great capacity to generate employment in various segments of the society, both skilled and unskilled) and at the regional level (creating business opportunities for rural areas which represents an element of settling population in a territory and favoring the creation and renewal of infrastructure).

Consequently, it is not enough to provide macroeconomic figures in terms of Gross Value Added (GVA), domestic production or number of jobs created in order to understand the net benefits of tourism. It is also necessary to consider the incidental costs and take into account the role of prices and income distribution mechanisms of each economy in order to quantify the changes in welfare associated with an increase in tourism. Moreover, tourism development can follow different models, each one with similar aggregate impact but with significantly different distributional effects.

In fact, regional differences in the inter-industrial structure, as well as differences in their distributional and redistributional systems, justify the obligation of implementing

individual analyses in order to identify the particular and specific economic effects of tourism expansion on the territory of reference. Additionally, as a result of an increase in tourism consumption some sectors undoubtedly benefit, but others do not, and consequently a multisectoral economy-wide model would appear to be the most appropriate approach for this type of analyses (Copeland, 1991).

Developing tools that can give detailed descriptions about the distributional effects of a particular tourism model (taking into account both supply and demand tourism) and its potential impact, would provide evidence for private and public agents to make more, and better informed, economic policy decisions on this issue.

Objectives

Therefore, our main research objective is to design and develop a model that allows the analysis of distributional effects at sectoral and household levels for a region like Galicia. In the first case, at the sectoral level, we will focus on analyzing the capacity of the economy to satisfy tourism demand by means of domestic production. That is, finding out to what extent the economy of a destination (Galicia) benefits from this external demand, by generating internal growth or, on the contrary, is this tourism demand satisfied by imports of products (also known as "leakages"). At the individual level, the aim is to show whether the effects of tourism are distributed uniformly among household groups or if winners and losers appear in the process of tourism development.

More specifically, this thesis will cover the following:

Chapter 01: In the first chapter, we use an interregional IO model to study the spatial interactions between Galicia and the rest of Spain that involves tourism consumption, for the period 2001–2007. Additionally, as a starting point for the rest of the thesis, the economic contribution of three different kinds of tourism consumption (two inbound and one domestic) is considered. Analyzing spillover effects is crucial for small, open regions where productive leakages are relevant, as could be the case in Galicia within the Spanish context.

Chapter 02: The aim of the second chapter is to present the first Social Accounting Matrix (SAM) for the Galician region. It shows a wide variety of households (eight different types disaggregated by level of income), two types of governments (regional

and central), four types of taxes, and 29 sectors, with special attention paid to those that are relevant for the evaluation of tourism policies. The integration of different data sources is needed in the elaboration: the Galician Input-Output framework from the year 2008, the Household Budget Survey, and the Living Conditions Survey being the most important ones. This SAM, which is elaborated with the purpose of being used as a database of a Computable General Equilibrium Model (CGEM), allows us to examine not only the production impact but also the distributive effects.

Chapter 03: The ways in which tourism consumption affects income distribution involves three channels: changes in prices, household earnings and government revenues. In this chapter, we focus our analysis on the latter two channels through a social accounting matrix (SAM) model of Galicia for the year 2008. Furthermore, in order to look further into the distributive effects, the traditional multiplicative and additive SAM multiplier decompositions are presented.

Chapter 04: When the poor are not involved in tourism (actively or passively), tourism activities deepen social inequalities and increase the gap between those with access to capital and those who are on the threshold of subsistence. Additionally, a better way of determining the degree of participation of the lower-income population is not through disposable income measures, but rather from a welfare point of view. This takes into account not only revenues gained from tourism but also the access to tourism products and the subsequent utility generated. Therefore, the main aim of this chapter is to calculate how an increase in tourism consumption affects resident households´ welfare disaggregated by level of income, using a static regional CGE model calibrated with the 2008 Galician SAM. Additionally, we show the effects of an increase in the value-added tax of tourism products.

General conclusions: At the end of the thesis we will present our main conclusions, its principal contributions to the existing research in the field and possible future work that begins from this point.

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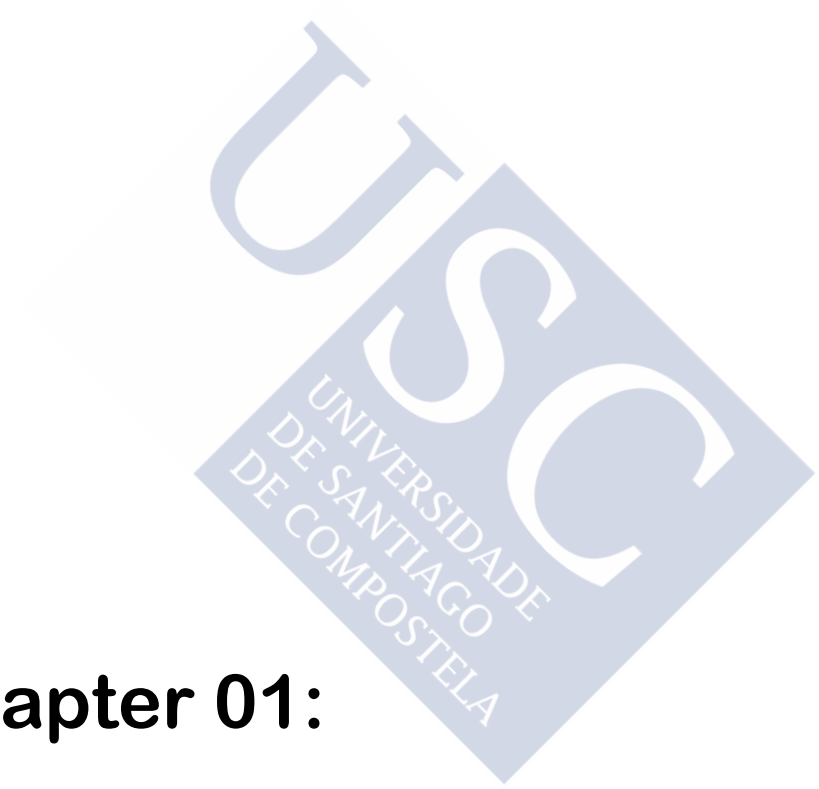

Chapter 01:

Spillover effects of tourism consumption between Galicia and the rest of Spain

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1. Introduction

Closed Input-Output models are commonly used for the estimation of the economic contribution of tourism consumption. However, it is important to take the interregional spillover effects into account, particularly in the case of small and open economies where productive leakages are very relevant. In order to avoid distortions in the design of economic development policies, in the share of tourism promotion budgets or in the allocation of environmental responsibilities, these effects must be considered in the analysis.

In the Spanish case, the economic contribution of tourism represents around 10.4% of the GDP and 11.8% of the total employment, following the results of the Spanish Tourism Satellite Account (TSA) of 2010 elaborated by the National Statistical Institute (INE). According to Eurostat, in 2010 Spain was the third European country by total overnight stays and, at NUTS 2 level, it had some regions on the top of the ranking such as Canary Islands, Catalonia, Balearic Islands or Andalusia[1]. Therefore, the economic impact of tourism within the country can vary widely from one region to another.

If we take a look at Galicia, the northwestern one of the 17 regions of Spain, its productive structure reveals an economy specialized on the production of primary products (fish, farming, food and beverages and production of electrical energy, among others; see Eurostat regional yearbook 2010) and with a relatively low weight in foreign tourism[2]. However, it has one of the most important urban destinations in Spain, Santiago de Compostela. According to the study UrbanTUR 2012 (Exceltur, 2013), it is ranked in the eighth place of the most visited cities in Spain and in the first place if we only consider cities with less than 150,000 inhabitants.

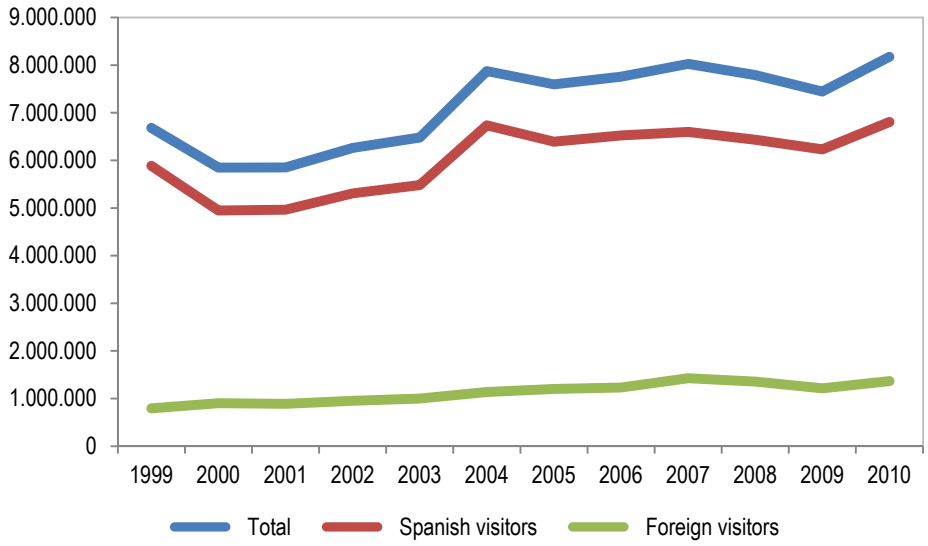
Following the Hotel Occupation Survey (HOS) data, Figure 10, overnight stays in Galicia has grown 22.32% from 1999 to 2010. The main visitors are the national ones

[1] Canary Island appeared in the first position, Catalonia was the third, Balearic Island the fifth and Andalusia the seventh. Galicia was in the 58th place (out of 272) taking into account that 2010 was a holy year or "año Xacobeo".

[2] In 2010, Galicia represented the 5.95% of the Spanish population (2,797,653 inhabitants) but only the 0.6% of the total foreign overnight stays in Spain.

(83.29% of the total in 2010), but the foreign tourists has experienced the biggest growth (71.71% in this period) [3].

Figure 10 - Galician overnight stays (1999-2010)

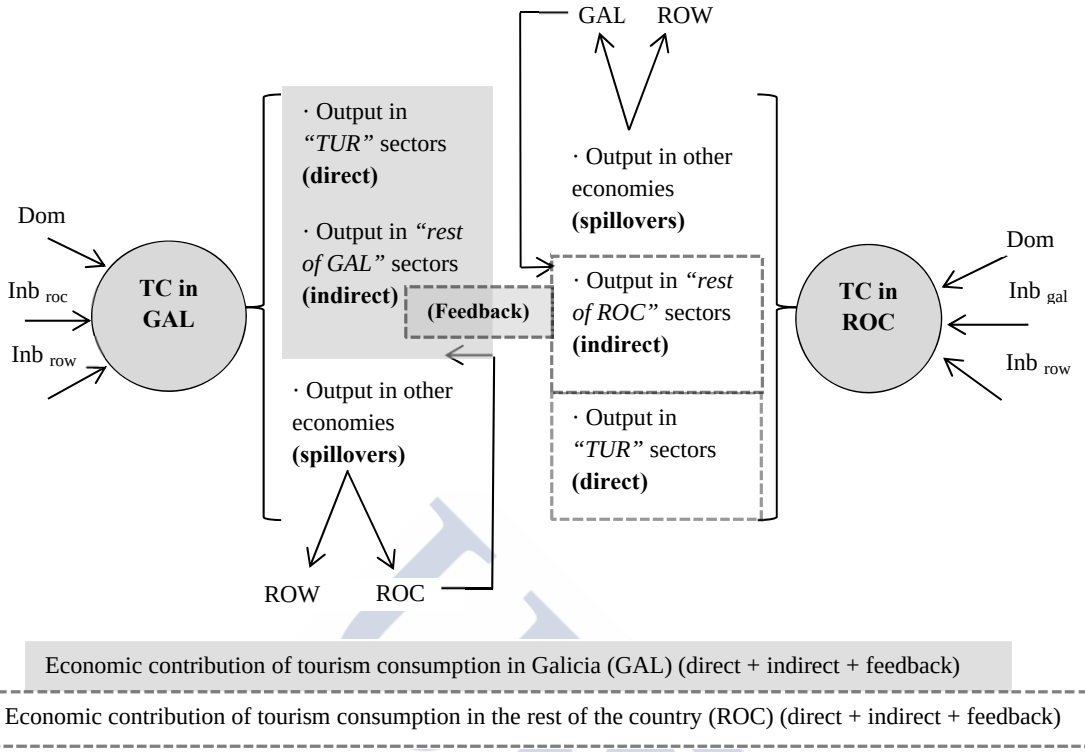


Source: Own elaboration from data of the Spanish Hotel Occupation Survey.

Therefore in this chapter, we divide the Spanish economy into two different parts, Galicia and the rest of the country, more based on services and specifically in tourism activities. The main aim is to calculate the total economic significance in both Galicia and the Rest of Spain and the spatial interactions between these economies that tourism consumption affects, illustrated in the Figure 11. To explain this, results on domestic production, gross value added and employment are presented for the period 2001-2007, in terms of contribution and multipliers. Additionally, three different kinds of tourism consumption are considered for both destinations: inbound tourism consumption made by foreign visitors, inbound tourism consumption made by national visitors and domestic tourism consumption made by residents in the own region.

[3] This increase as an international destination has mainly two causes: first, the promotion of the "way of Santiago de Compostela" as a pilgrimage location and, second, the increase of the international flights in the Galician airports with the arrival of the low cost companies (in the last 10 years the increase of travellers from/to international destinations has increased 157%, from 190,000 in 2003 to 488,000 in 2012, according to the AENA (Spanish Airports and Air Traffic) data.

Figure 11 - From tourism consumption to economic contribution in an interregional framework



A multisectoral interregional model of 2005 is implemented for the simulations. Specifically, a bi-regional Input-Output model with 30 sectors is applied.[4] Therefore, it allows us to account for the tourism productive spillovers. In this chapter, the traditional meaning of spillover is going to be employed (Miller and Blair, 2009). It can be defined as the economic consequences in a region S due to a stimulus in the final demand of the region R.

The rest of the chapter is divided into four more sections. In the first one we analyze the related work about tourism impacts particularly focused on regional or sub-national economies. In the second section the objective is to describe the specification of the interregional model that is going to be used in the simulations. We explain also the steps to do the estimation of this bi-regional multisectoral table and the exogenous final demand vector and the main data sources employed. After that, we present the main

[4] One of the main disadvantages associated with the input-output analysis is the time lag. It means that the table of technical coefficients available for the economy will generally reflect data from a much earlier year (Miller and Blair, 2009). This is inevitable since producing an Input-Output table is an expensive and time-consuming task, both at a national and a regional level. So, it is normal to have a time lag of between 5 and 7 years from the data of publication and the reference data of the table. However, as Robles and SanJuan (2005) show there are numerous works demonstrating the general stability of the productive structure in a period of time like the one considered.

results obtained in terms of economic significance and potential impact. Finally the last section mentions the main conclusions reached through this chapter.

2. Related work

In general, tourism impact studies are usually conducted with economy-wide models: Input-Output (IO), Social Accounting Matrix (SAM) or Computable General Equilibrium (CGE) models. Like Polo and Valle (2008a) have pointed out, IO analysis has been the traditional approach used to estimate tourism effects and assess the impact of tourism on an economy (Fletcher, 1989, 1994; Archer, 1982; Frechtling and Horvath, 1999). Despite its well-known weaknesses and limitations (Dwyer *et al.*, 2004), it has several characteristics that make it the most implemented procedure in these kinds of studies, such as: simplicity or clearness, among others. Although, CGE models were also employed in the last decades (Dwyer *et al.*, 2006; Blake *et al.*, 2008), they show lower estimations than IO models (Zhou *et al.*, 1997) due to the reallocation and substitution of resources and because IO analysis does not allow prices to change. However, Polo and Valle (2008b) present evidences that IO and CGE models may not be so different when sensible closure rules are used.

These types of analysis may be directed to countries, like in the case of Bermuda (Archer, 1995), Singapore (Kahn *et al.*, 1990), Ireland (Henry and Deane, 1997), China (Oosterhaven and Fan, 2006), Seychelles (Archer and Fletcher, 1996), Tanzania (Kweka *et al.*, 2003) or Spain (Blake, 2000), among others. In addition, they were also used to calculate the economic impact in a region within a country. Some examples of this are the cases of Wales (Archer, 1973), Balearic Islands (Polo and Valle, 2008a), North Carolina (Chhabra *et al.*, 2003) or Victoria (West and Gamage, 2001).

However, there is a much smaller literature focused on measuring the impact of tourism using interregional IO models in a similar way that is proposed in this chapter. Eriksen and Ahmt (1999) presented an interregional model for measuring the economic impact of tourism in 16 Danish regions, where they consider 10 sectors and 17 final demand components. Another study that implements a multisectoral interregional model in order to calculate the effects of tourism consumption is Manente (1999). That paper identifies the impact of different tourism segments on 10 Italian regions.

3. Model specification

3.1. General specification of the interregional model

In this chapter, an interregional version of the standard Input Output is applied (Isard, 1951). This macroeconomic simulation model consists of two parts: production and trade Leontief functions, and different accounting identities. Described in a region *r* point of view, the structural form of the model (Miller and Blair, 2009) is:

$$\boldsymbol{x^r} = (\boldsymbol{I} - \boldsymbol{A^r} - \boldsymbol{A^{rs}}(\boldsymbol{I} - \boldsymbol{A^s})\boldsymbol{A^{sr}})^{-1}\boldsymbol{f^r} \qquad (1)$$

Where $\boldsymbol{x}$ is the vector of outputs obtained and $\boldsymbol{f}$ the vector of exogenous final demand. $\boldsymbol{A}$ is a matrix of technical coefficients and $\boldsymbol{I}$ is the identity matrix and, finally, the superscripts r identify the first region and s the second one. Thus, $\boldsymbol{A^r}$ and $\boldsymbol{A^s}$ will be the intraregional matrix of region r and region s and $\boldsymbol{A^{rs}}$ and $\boldsymbol{A^{sr}}$ the interregional matrix of coefficients between them.

From this, and in a similar way with the traditional model, one can easily derive the formulation for the Gross Value Added (GVA) ($\boldsymbol{w^r}$) and the employment ($\boldsymbol{o^r}$):

$$\boldsymbol{w^r} = \left[\widehat{\boldsymbol{V}}(\boldsymbol{I} - \boldsymbol{A^r} - \boldsymbol{A^{rs}}(\boldsymbol{I} - \boldsymbol{A^s})\boldsymbol{A^{sr}})^{-1}\right]\boldsymbol{f^r} \qquad (2)$$

$$\boldsymbol{o^r} = \left[\widehat{\boldsymbol{N}}(\boldsymbol{I} - \boldsymbol{A^r} - \boldsymbol{A^{rs}}(\boldsymbol{I} - \boldsymbol{A^s})\boldsymbol{A^{sr}})^{-1}\right]\boldsymbol{f^r} \qquad (3)$$

Where $\boldsymbol{w}$ is the vector of GVA obtained and $\boldsymbol{o}$ the vector of number of equivalent jobs needed. $\widehat{\boldsymbol{V}}$ and $\widehat{\boldsymbol{N}}$ are diagonal matrices that present the GVA and the employment direct multipliers, respectively.

Two principal benefits appear over the single-region models. The first one lies in its ability to produce estimations of both regional and national impacts within a framework that consistently deals with intraregional impacts and interregional spillovers together (Boosma and Oosterhaven, 1992). In other words, it describes where the production is generated in order to satisfy the final demand, being able to allocate income revenues or environmental responsibilities, among other applications. The second one is that this kind of model allows us to estimate interregional feedback, which can represent around 1 to 10 per cent of the intraregional indirect effect (Oosterhaven, 1981), depending on the size of the sub-national economy.

On the other hand, there also appear some disadvantages. Beyond the traditional limitations of the Leontief model: no assumption of supply constraints, constant return to scale, fixed commodity input structure or homogeneous sector output (Miller and Blair, 2009); the supposition of linear trade functions can be added.

As was stated before, the second part of this model relies on the macroeconomic accounting identities. The most important one is that output supply equals demand. Total output of the economic system is exactly equal to total demand or, equivalently, gross national product is the same as gross national expenditure, describing the first account (production account) of the System of National Accounts (SNA):

$$\boldsymbol{Q} + \boldsymbol{M} = \boldsymbol{C} + \boldsymbol{K} + \boldsymbol{G} + \boldsymbol{E} \qquad (4)$$

Thus, the supply in an economy is defined by the domestic production (**Q**) and the imports (**M**). At the same time, the consumption of the households (**C**), the investment (**K**), the expenditure of the government (**G**) and the exports (**E**) account for the aggregated demand.

Finally, this multisectoral model must fulfil another accounting identity: the resulting sub-national intraregional ($\boldsymbol{Z}^r$, $\boldsymbol{Z}^s$) and interregional flows ($\boldsymbol{M}^{rs}$, $\boldsymbol{M}^{sr}$) need to sum the domestic national ones ($\boldsymbol{Z}^n$).

$$\boldsymbol{Z}^n = \boldsymbol{Z}^r + \boldsymbol{Z}^s + \boldsymbol{M}^{rs} + \boldsymbol{M}^{sr} \qquad (5)$$

Taking into account that $\boldsymbol{Z}$ is a matrix of domestic intraregional flows and $\boldsymbol{M}$ is a matrix of intermediate imports. The superscript *n* accounts for national, while *r* and *s* are the two regions, in the same way as we have explained before.

3.2. The construction of the interregional Input-Output matrix

The primary data source used in order to obtain the regional flows is the Galician Input Output framework developed by the Galician Statistical Institute (IGE) following the recommendations of the European System of Accounts (ESA). With this the interdependence in the Galician productive structure can be represented and we get data about trade flows. 2005 data is available for total output, gross value added, full-time

equivalent jobs and, also, total imports from the rest of Spain and total exports to the rest of Spain.

Data about the Spanish productive structure was obtained from the Spanish Input Output framework elaborated by the National Statistical Institute (INE). In the same manner, total output, gross value added or full-time equivalent jobs, among others, are available for the year 2005.

All phases and steps followed in the estimation of the interregional table are summarized in the next table:

Table 3 - Overview of the construction method for the interregional input-output table

Step 1	*Adaptation of given data.* (1) Confrontation of the national input-output table with the regional one. (2) Determination of the homogenized IO tables (30 sectors)
Step 2	*Construction of the interregional transactions tables.* (3) Calculation of the regional domestic imports table. (4) Calculation of the regional domestic exports table.
Step 3	*Construction of the bi-regional input-output table* (5) Calculation of the intraregional transactions table for the rest of the country (6) Revision of the whole consistency of the table and confrontation with the national data

Step 1: Adaptation of given data

Although there are both Galician and Spanish input-output tables for the same year 2005 and they are elaborated following the recommendations of the European System of Accounts (ESA), they are not completely comparable. They are not constructed using the same methodology, i.e. neither a bottom-up nor a top-down. This also means that data for Galicia (g) and data for the rest of Spain (roc) do not add to the corresponding national total of Spain (esp). Therefore, the first step in the construction of this model is a confrontation of the national and the regional input-output tables.

After that, consistent and homogenized IO tables can be elaborated, in our case 30 sectoral-tables[5] from the 73 sectors of the original tables.

[5] Table 8 in the appendix lists the economic sectors considered in the model.

Step 2: Construction of the interregional transaction tables

It is well known that the most difficult task in the elaboration of an interregional model is to estimate the regional trade patterns with the other region(s) considered. In our case, the information available is:

$\boldsymbol{m_p^{vd}}$: Vector of *p* imports *(nx1)* of the region *v* from the origin *d*.

$\boldsymbol{M_p^v}$: Import matrix of the region *v (nxn).*

$\boldsymbol{e_p^{vd}}$: Vector of *p* exports of the region *v* to the destination *d (nx1).*

$\boldsymbol{B_p^v}$: Domestic technical coefficient matrix of the region *v* by rows *(nxn).*

The first superscript *v* corresponds with the set of regions: g for Galicia, roc for the rest of Spain and esp for the whole Spain. The second superscript d stands for the origin/destination of the imports/exports: roc for rest of Spain, roe for rest of Europe, row for rest of the World. Finally, the subscript *p* represents the kind of import: t for totals, i for the intermediate and *u* for the final ones.

In this procedure, we make a simple correction of the Galician intermediate imports matrix by rows, through an import coefficient from the rest of Spain ($\mu_t^{g_{roc}}$):

$$\mu_t^{g_{roc}} = \boldsymbol{m_t^{g_{roc}}} / \left(\boldsymbol{m_t^{g_{roc}}} + \boldsymbol{m_t^{g_{roe}}} + \boldsymbol{m_t^{g_{row}}}\right) \qquad (6)$$

$$\boldsymbol{M_i^{g_{roc}}} = \boldsymbol{M_i^g}\ \mu_t^{g_{roc}} \qquad (7)$$

The idea behind this adjustment is to assume that the same proportion of total imports from the rest of Spain will remain for the intermediate imports.

In the case of the Galician intermediate exports table, it requires other different assumptions than the ones made for the imports table. We first need to define a coefficient of intermediate imports of Spain ($\boldsymbol{\varepsilon_i^{esp}}$) taken from the trade data of the Spanish IO table. The coefficient helps us to divide Galician total exports to the ROC ($\boldsymbol{e_t^{g_{roc}}}$) between intermediate and final ones. Then we need to distribute the sum of intermediate exports between the different sectors considered. For that the best information available is the one that appears in the national table, concretely in our case, the structure by rows of the Spanish domestic table ($\boldsymbol{B_i^{esp}}$):

$$\varepsilon_i^{esp} = m_i^{esp} / \left(m_t^{esp_{roe}} + m_t^{esp_{row}} \right) \quad (8)$$

$$e_i^{g_{roc}} = e_t^{g_{roc}} \varepsilon_i^{esp} \quad (9)$$

$$E_i^{g_{roc}} = B_i^{esp} e_i^{g_{roc}} \quad (10)$$

Both row corrections fulfill the trade identities for Galician imports and exports (which is our primary data):

$$m_t^{g_{roc}} = m_i^{g_{roc}} + m_u^{g_{roc}} \quad (11)$$

$$e_t^{g_{roc}} = e_i^{g_{roc}} + e_u^{g_{roc}} \quad (12)$$

Step 3: Construction of the bi-regional input-output table

The last step only requires some simple calculations and adjustments following the accounting identities described before:

$$Z^{esp} = Z^g + Z^{roc} + M_i^{g_{roc}} + E_i^{g_{roc}} \quad (13)$$

The final table Z^{roc} can be easily calculated from this identity once we have estimated the other four matrices. The final adjustments to achieve global consistency have been made using the RAS method (Stone, 1961). In the estimation of the interregional framework, discrepancies were found in some of the cells of the matrices, which accounted for 0,85% of the total intermediate inputs. In order to correct that, this adjustment technique was applied, incorporating exogenous information[6] into the correction process (Paelink and Waelbroeck, 1963; Bacharach, 1970).

4. Estimation of the final demand vector

Regarding tourism sources in order to construct the final demand vector, there is not a single one that we can use at regional level for Galicia. Although there are some regional Tourism Satellite Accounts (TSA) in Spain (Andalusia or Madrid), this is not the case of Galicia. So, at this point, we have mainly two demand-approach options:

- The first one is to build a regional TSA (or just the consumption account) for Galicia from the data of the Spanish TSA using a "regional allocation

[6] Some of the cells are considered as known and equal to zero.

approach". This means to use a set of regional indicators, such as: numbers of tourists in accommodation services or overnight stays (from the Hotel Occupancy Survey (HOS) elaborated by the INE) or number of foreign and national visitors (from the Frontur and Familitur elaborated by the IET), in order to allocate the regional tourism consumption and other significant variables from the Spanish TSA.

- An alternative in the Galician case is to use the information about non-residents' consumption that appears in the Galician Input Output framework of 1998. This was a pioneer analysis done at the Spanish regional level that describes the structure of the inbound consumption by products. The main disadvantage is the lag of time from 1998, which could make this data looks outdated. The other significant drawback is related with the lack of information about the domestic tourism consumption.

In this chapter, we choose the first alternative since the second one seems to have more questionable assumptions. Thus, the construction process presupposes the availability of regional and national tourism indicators in order to use a "regional allocation approach". Figure 12 in the appendix shows the procedure followed and the main databases used.

Therefore, the primary source of information employed was the Spanish TSA, which divides tourism consumption in two different profiles: non-residents' consumption and residents' consumption. Consequently, here appears the first difference between a national and a sub-national economy, the residential criteria. In other words, for a regional economy there are two kinds of non-residents: the foreign and the national ones. It means that the regional tourism consumption vector ($\boldsymbol{f_T}$) is composed by:

$$\boldsymbol{f_T} = \boldsymbol{f_{dom}} + \boldsymbol{f_{inb_n}} + \boldsymbol{f_{inb_f}} \qquad (14)$$

Where dom stands for the domestic tourism consumption and inb means non-residents' tourism consumption (inbound). The subscripts n and f represent the origin of the non-residents: national or foreign.

Once this consideration is described, the explanation of the estimation can begin with the Galician tourism consumption vector. First of all, for the foreign non-residents' tourism consumption ($\boldsymbol{f_{inb_f}}$) we needed to obtain the total amount of consumption of

this segment of visitors and then consider how they distributed it along the different products/industries (characteristic and other products).

There are two main indicators that can be used for the allocation of the Spanish non-residents' tourism consumption: the share of *arrivals of visitors* taken from the Frontur database and the share of *overnight stays* from the HOS. 2001 to 2007 data is available in both sources but the utilization of each one involves different assumptions. Using the share of arrivals as the main indicator we are assuming that the length of stay of the foreign non-residents is the same in the rest of Spain and in Galicia. We are also assuming that the daily average expenditure for the rest of Spain is the same as the Galician one. However, using the share of overnight stays indicator, we are just assuming that the daily average expenditure for the rest of Spain is the same as the Galician one since the length of stay is considered. Taking into account these differences, the share of *overnight stays* from the HOS is taken as the main indicator to get the total amount of non-residents' tourism consumption.

In the case of the national non-residents' tourism consumption ($\boldsymbol{f_{inb_n}}$) the total amount of consumption is obtained in a similar manner. Again, two indicators can be constructed in order to allocate the Spanish residents' tourism consumption: the share of *arrivals of visitors* from the Familitur database and the share of *overnight stays* taken from the HOS. Like in the foreign vector, the same period is available and the same assumptions are implicated. Again, the overnight ratio is chosen as a best option. Nevertheless, the amount obtained in this case is the share of the Spanish residents' tourism consumption that corresponds to Galicia, i.e. $\boldsymbol{f_{dom} + f_{inb_n}}$ in a Galicia point of view. Therefore, in order to distinguish between these two vectors the only information available is the one from the HOS, which describes the overnights of tourists taking into account the Spanish region of origin.

Finally, we needed to distribute this consumption between the different tourism characteristic products[7]. The Spanish TSA reflects two kinds of behaviors or profiles: foreign and national. In this chapter, the foreign one is applied to the foreign non-

[7]The rest of the tourism consumption, i.e. goods, margins and other services, are distributed in the three vectors using the information about non-residents' consumption that appears in the Galician Input-Output framework of 1998.

residents' tourism consumption while the national one is applied to the national non-residents' tourism consumption and to the Galician domestic tourism consumption[8].

For the rest of the country (ROC) final demand vector the calculations are simpler. In the case of the foreign non-residents' tourism consumption ($\boldsymbol{f_{inb_f}}$) the difference between the Spanish data from the TSA and the estimated Galician one is applied. For the calculation of the domestic consumption ($\boldsymbol{f_{dom}}$) and the inbound made by nationals ($\boldsymbol{f_{inb_n}}$) (in this case Galician visitors that goes to the ROC), an indicator is constructed from the HOS which describes the *overnights stays* of tourists taking into account the Spanish region of origin, as in the Galician situation. Again, for the distribution of the total consumption between the different products, the same two profiles are used: foreign and national as appear in the Spanish TSA.

As can be seen in table 4, the estimated total amount of tourism consumption is continuously increasing in this period 2001-2007. Disaggregating by tourism profiles, for Galicia the $\boldsymbol{f_{inb_n}}$ is by far the most important one representing more than the 50% of the total consumption. However, for the ROC the most important category is the $\boldsymbol{f_{inb_f}}$.

Regarding their evolution, we can state another new difference between Galicia and the ROC performances. For example, in Galicia the most important increase appears for the $\boldsymbol{f_{inb_f}}$ (89.1%) and the $\boldsymbol{f_{dom}}$ (78.8%), while in the ROC it is for the $\boldsymbol{n}$ (64.8%) and the $\boldsymbol{f_{dom}}$ (62.7%). Another significant feature to notice is the relevance of the Xacobeo 2004[9] in the evolution of the $\boldsymbol{f_{inb_n}}$ in Galicia. In fact, the growth in that year for this category was around 31%.

[8]The TSA is a statistical tool that has been developed in a consistency framework with the System of National Accounts. The steps to transform the estimated consumption account into the 30 industrial vectors are perfectly evident.

[9] The Xacobeo, or Holy year, is the main touristic event for Galicia. Although, the pilgrimage route exists since the medieval ages, it got a great success after a first big promotion in 1993.

Table 4 - Estimated total tourism consumption by categories and destination (Millions of euros)

		2001	2002	2003	2004	2005	2006	2007
Galicia	Inbound f	229	257	277	335	365	365	433
	Inbound n	1,196	1,319	1,394	1,826	1,646	1,677	1,761
	Domestic	619	757	786	852	955	1,007	1,107
	Total	2,044	2,333	2,457	3,013	2,966	3,050	3,302
ROC	Inbound f	36,703	36,346	37,667	39,293	41,852	44,618	46,680
	Inbound n	919	981	1,042	1,136	1,257	1,401	1,515
	Domestic	28,449	30,851	33,089	35,959	39,619	43,265	46,298
	Total	66,071	68,177	71,799	76,387	82,727	89,284	94,494
Spain	Inbound	36,932	36,603	37,944	39,628	42,217	44,983	47,113
	Domestic	31,184	33,908	36,312	39,772	43,476	47,350	50,682
	Total	68,115	70,510	74,256	79,400	85,693	92,333	97,795

5. Simulation results

5.1. Economic contribution

The economic contribution of tourism can be seen as a synonym of tourism economic significance, i.e. the share of key macroeconomic variables (GDP, GVA, Household income or number of jobs) that corresponds to the expenses made by inbound and domestic visitors. In order to account for the total contribution of tourism, both direct and indirect effects must be considered. However, this cannot be confused with the net benefits. Estimating the net benefits of tourism on an economy means not only to calculate revenues but also costs associated with these activities.

Taking into account the data and the methodology that was presented before, some simulations can be made about the economic contribution of tourism consumption on both regions. We begin by presenting the results for the following indicators: total Output, Gross Value Added (GVA) and employment measured in number of full-time equivalent jobs.

As Table 5 shows, tourism consumption represents more than 4% of the total domestic output of Galicia. It has a positive trend until 2004 (Xacobeo year) and then it starts to descend. Regarding tourism profiles, they present different evolutions. The national non-residents' tourism consumption has a positive growth until 2004 and then it seems to descend critically, while the foreign and the residents ones have a more constant trend. In terms of GVA it signifies more than 4.5%. As expected, it has the highest percentage in 2004 with almost 5.5% of the revenues of the primary factors. Finally, in

number of jobs generated, it means almost 50,000 full-time jobs in the last years, representing more than the 4% of total employment.

Table 5 - Economic contribution of tourism consumption 2001-2007 (Millions of euros and equivalent jobs)

		2001	2002	2003	2004	2005	2006	2007
Galicia								
	Total domestic output	3,025	3,452	3,635	4,457	4,388	4,511	4,883
	Contribution (%)	4.22%	4.43%	4.38%	4.98%	4.54%	4.18%	4.11%
	Total employment	38,269	41,964	42,090	48,877	46,440	45,874	47,286
	Contribution (%)	3.72%	4.02%	4.01%	4.59%	4.28%	4.09%	4.05%
	Total GVA	1,503	1,681	1,804	2,202	2,153	2,185	2,352
	Contribution (%)	4.56%	4.79%	4.83%	5.49%	5.01%	4.67%	4.65%
	Inbound f (%)	0.50%	0.51%	0.53%	0.59%	0.60%	0.54%	0.59%
	Inbound n (%)	2.61%	2.62%	2.68%	3.32%	2.81%	2.65%	2.57%
	Domestic (%)	1.45%	1.66%	1.62%	1.58%	1.60%	1.48%	1.49%
Rest of Spain								
	Total domestic output	114,284	117,771	124,077	131,969	142,987	154,278	163,245
	Contribution (%)	9.35%	8.90%	8.76%	8.64%	8.55%	8.42%	8.36%
	Total employment	1,266,085	1,261,235	1,269,996	1,305,182	1,371,643	1,428,077	1,453,775
	Contribution (%)	8.36%	8.13%	7.99%	7.99%	8.12%	8.19%	8.11%
	Total GVA	56,643	58,472	61,345	64,738	69,202	73,443	77,474
	Contribution (%)	9.68%	9.33%	9.16%	9.03%	8.98%	8.85%	8.66%
	Inbound f (%)	5.33%	4.93%	4.76%	4.60%	4.49%	4.37%	4.22%
	Inbound n (%)	0.14%	0.14%	0.13%	0.14%	0.14%	0.14%	0.14%
	Domestic (%)	4.21%	4.26%	4.27%	4.30%	4.35%	4.34%	4.31%

In a similar way, it represents more than 8% of the total domestic output of the ROC, but with a negative trend. The domestic tourism consumption has a positive growth while the inbound descends significantly. Identically conclusions can be drawn from the GVA results, representing almost 9% of the revenues of the primary factors. Finally, in terms of employment, it has a positive trend reaching 1,453,775 equivalent jobs for 2007 (8.11%).

5.2. Economic impact: multipliers

While the economic contribution measures the size and overall significance of tourism within an economy, the economic impact refers to changes in the final demand vector. So these two terms are different. In the IO analysis this is measured through the economic multipliers, which show the effect of an additional euro of tourism consumption.

Table 6 displays the results in terms of multipliers. For the year 2007, €1.48 of domestic production is needed to satisfy 1 additional euro of the tourism demand and, €0.71 of that amount is GVA (the rest is intermediate consumption). In the case of employment multipliers, an additional 1 million euro of final demand will generate around 14 full-time jobs. Taking a look at the evolution of the multipliers, all of them have a negative trend, being higher in 2000 than in 2007. This is particularly significant in the case of the employment multiplier that has descended in this period by 23%. Moreover, it should be noted that the GVA multiplier has also descended by 3%.

Table 6 also shows the results for the ROC. Again analysing the year 2007, €1.74 of domestic production is needed to satisfy 1 additional euro of the final demand and €0.82 of GVA. The employment multipliers show that 1 additional million euro of final demand will generate around 15 full-time jobs. As occurred with the Galician multipliers, taking a look at the evolution, all of them have a negative trend, being higher in 2000 than in 2007. However, all of them are higher in the case of the ROC than in Galicia. This means that each euro spent by a visitor will have a higher potential impact on the rest of Spain than on Galicia due to their economic structure.

Table 6 - Economic impact of tourism consumption 2001-2007 (Multipliers)

		2001	2002	2003	2004	2005	2006	2007
Galicia								
	Total domestic output	1.480	1.480	1.479	1.479	1.479	1.479	1.479
	Total employment	18.722	17.986	17.130	16.223	15.656	15.043	14.322
	Total GVA	0.735	0.721	0.734	0.731	0.726	0.716	0.712
	Inbound f (%)	0.715	0.703	0.713	0.709	0.701	0.695	0.690
	Inbound n (%)	0.738	0.723	0.737	0.734	0.729	0.719	0.716
	Domestic (%)	0.738	0.723	0.737	0.734	0.729	0.719	0.716
Rest of Spain								
	Total domestic output	1.742	1.714	1.741	1.736	1.745	1.734	1.738
	Total employment	19.297	18.359	17.822	17.169	16.735	16.052	15.474
	Total GVA	0.863	0.851	0.861	0.852	0.844	0.826	0.825
	Inbound f (%)	0.850	0.851	0.846	0.838	0.826	0.812	0.808
	Inbound n (%)	0.867	0.866	0.864	0.858	0.847	0.833	0.831
	Domestic (%)	0.867	0.866	0.863	0.857	0.847	0.833	0.832

Comparing the results obtained in table 5 and 6, the big difference between the significance of tourism consumption among each region is mainly provoked by the

differences on the consumption values (total expenditure of the visitors) and not on the type of tourism profile (domestic or inbound). Although the consumption profiles are considerably different (even at this level of aggregation), differences in the multipliers are relatively small.

The results also show that the multiplier effect of inbound foreign tourism is reducing faster than domestic tourism in both Galicia and ROC. It is important that tourism development strategies take this into account and, consequently, they must support activities such as air transport, auxiliary transport services and business services (all of them easy to import and with higher level of international competition) and not just the most characteristics industries (restaurants and hotels).

5.3. Spillover effects

Tourism spillover effects can be understood as the amount of imports from a region that a second region needs in order to satisfy its tourism consumption. In other words, it can also be seen as the share of the economy of a region that depends on the performance of tourism consumption in the second region.

Therefore, tourism consumption in Galicia generates more or less 0.05% of the total domestic output, the total GVA and the total employment of the ROC. In absolute terms, it needs/generates 7,000 full-time jobs in the ROC, with a positive trend from 2000 to 2007. A similar analysis can be made with the spillover multipliers. For the year 2007, €0.30 of domestic output in the ROC is needed to satisfy 1 additional euro and €0.12 will be generated to compensate for the primary factors. Regarding the employment results, 1 additional million euro that visitors spend in Galicia would generate 2 full-time jobs in the ROC.

If we examined the spillover effects over Galicia, we find that around 1% of the Galician domestic output depends on the tourism consumption in the other region destination (in terms of contribution). This means a higher dependency of Galicia on the ROC, as could be expected. Nevertheless this occurs even when tourism is considered a non-tradable activity by the related literature. It is also important for the Galician GVA and the employment signifying around 0.9% of the total. This means that close to 10 thousand equivalent jobs were created in Galicia each year of the period to satisfy the tourism demand that arrived at the ROC.

Table 7 - Economic spillovers of tourism consumption between Galicia and the ROC, 2001-2007 (Millions of euros and equivalent jobs)

		2001	2002	2003	2004	2005	2006	2007
Galicia								
	Total domestic output	826	841	888	944	1,021	1,098	1,157
	Contribution (%)	1.15%	1.08%	1.07%	1.05%	1.06%	1.02%	0.97%
	Spillover Multiplier	0.301	0.300	0.300	0.299	0.300	0.300	0.299
	Leakage (%)	20.36%	20.28%	20.27%	20.22%	20.27%	20.27%	20.25%
	Total employment	10,643	10,030	9,722	9,715	9,831	9,816	9,882
	Contribution (%)	1.03%	0.96%	0.93%	0.91%	0.91%	0.88%	0.85%
	Spillover Multiplier	2.752	2.650	2.542	2.419	2.344	2.243	2.119
	Leakage (%)	14.70%	14.74%	14.84%	14.91%	14.98%	14.91%	14.80%
	Total GVA	313	317	329	349	377	398	410
	Contribution (%)	0.95%	0.90%	0.88%	0.87%	0.88%	0.85%	0.81%
	Spillover Multiplier	0.124	0.123	0.123	0.121	0.119	0.117	0.116
	Leakage (%)	16.83%	17.04%	16.81%	16.54%	16.46%	16.27%	16.34%
Rest of Spain								
	Total domestic output	616	700	737	901	889	914	989
	Contribution (%)	0.05%	0.05%	0.05%	0.06%	0.05%	0.05%	0.05%
	Spillover Multiplier	0.013	0.012	0.012	0.012	0.012	0.012	0.012
	Leakage (%)	0.72%	0.71%	0.72%	0.72%	0.71%	0.71%	0.71%
	Total employment	5,626	6,184	6,246	7,289	6,954	6,841	6,997
	Contribution (%)	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%
	Spillover Multiplier	0.162	0.146	0.136	0.128	0.120	0.110	0.105
	Leakage (%)	0.84%	0.80%	0.77%	0.74%	0.72%	0.69%	0.68%
	Total GVA	253	287	303	364	354	356	384
	Contribution (%)	0.04%	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%
	Spillover Multiplier	0.005	0.005	0.005	0.005	0.005	0.004	0.004
	Leakage (%)	0.55%	0.54%	0.54%	0.54%	0.54%	0.54%	0.53%
Balance of Spillovers	(from Galicia point of view)							
	Total domestic output	210	141	151	43	132	183	169
	Total employment	5,017	3,847	3,476	2,426	2,877	2,975	2,885
	Total GVA	60	30	26	-15	23	42	26

If we measure the leakage ($\boldsymbol{L}$) as:

$$\boldsymbol{L} = \frac{\boldsymbol{Spillover\ Multiplier}}{\boldsymbol{Total\ Domestic\ Multiplier}} \qquad (15)$$

There appear big differences between these two regions. From the Galicia point of view, the leakage to the ROC economy is around 20%, in terms of output. This means that the 20% of the generated output leaks to the other economy. Again, as expected, if we take a look to the ROC results, the leakage in the other way around is considerably lower.

This means that a higher specialization in products which supplies tourism activities (like happened for the ROC case) produce a change between intermediate imports and domestic production closing this tourism consumption leakage.

The balance of the spillover effects can be calculated as the difference between the spillover effects on these two regions. This can give us a measure of the amount of revenues gained in a region due to tourism consumption in the other compared with the opposite case. In our example of Galicia and ROC, as table 7 shows, Galicia has a positive sign, and so obtaining more incomes than the ROC.

Moreover, the great importance that the Xacobeo year has on the Galician tourism consumption performance should be highlighted. In fact, it is the only year in which Galicia has a negative sign in the balance of spillover effects (in GVA terms). This means that the economic dependence of Galicia on the productive structure of ROC is very important, but even higher in the case of tourism activities. Therefore, the impact of the tourism consumption in Galicia affects the level of production of ROC (€0.30 per each euro spent by visitors in Galicia is demand of ROC products), which does not occur on the contrary (only €0.013 of each euro spent in ROC affects the Galician production). However, this multiplier effect is cancelled with the high difference on the volume of tourism consumption that table 4 showed. Tourism consumption in the ROC is 30 times higher than the tourism consumption in Galicia. Therefore, increases in the tourism demand in Galicia can lead to unexpected net results, as seen in the Holy Year of 2004.

6. Summary and conclusions

Trade relations between regions inside a national economy can alter the contribution of any activity to regional GDP. As shown in this chapter, the spatial interactions that tourism consumption involves are one of these cases. The indirect effects of an increase in consumption are not limited to the economy itself but also to those economies which supply intermediate inputs to the industries of the region. In order to capture the productive effects with some regional and sectoral detail, an interregional IO model between Galicia and the rest of the country (ROC) was developed.

There appear important spillover effects presenting substantial asymmetries through the regions. From the Galician point of view, €0.30 of domestic output goes to ROC for

each euro of final demand. In the other way, €0.013 comes to Galicia for each euro of tourism consumption spent in the ROC. This means a big asymmetry in terms of dependency between these two economies, as expected. The Galician productive structure needs to import more products from the ROC to satisfy its tourism demand than the ROC needs Galician products. Following this, the Galician productive structure is not specialized on the production of goods and services demanded by visitors.

More specifically, the main ROC products imported by Galician industries are food and beverages (which account for the 18% of the total spillovers), transport and communicating services (13%) and real estate activities (13%). On the other hand, Galicia produces food products and beverages (15%), primary sector products (13%) and electrical energy, steam and hot water (11%) in order to be exported to ROC. This also highlights differences in the economic productive structure of the two regions. Not only that ROC depends more on tourism activities than Galicia (around 9% and around 4.5% of the GVA, respectively), but also that Galicia has an economy that is based on the exploitation of natural resources to a greater extent.

Moreover, with this methodology, for 2007 the results indicate that tourism consumption represents in Galicia 4.1% of the Domestic Output, 4.7% of the GVA and 4.1% of the employment, i.e. 47,286 full-time jobs. However, the evolution of those figures from 2001 to 2007 is not particularly constant. In terms of relative contribution, we could distinguish two different periods for all the macroeconomic variables: a continuous growth until the Xacobeo 2004 (achieving 5.0% of the Domestic Output, 5.5% of the GVA and 4.6% of the employment (48,877 full-time jobs)) and a fall after that year. This evolution is mainly provoked by the inbound consumption made by the nationals (living in the rest of Spain). This tourism profile accounts for around 60% of the total consumption while foreign and resident tourism consumption have a participation of more or less 12% and 28%, respectively.

In the case of the rest of the country (ROC), the results double the economic contribution of the Galician ones, achieving 8.4% of the Domestic Output, 8.7% of the GVA and 8.1% of the total employment (1,453,775 full-time jobs). This also means that, in the Spanish context, Galicia is not a high-specialized tourism region.

In fact, the results of this chapter show two key aspects in regional tourism development that cannot be observed performing a traditional tourism impact analysis. On the one hand, from a local perspective, they highlight that Galicia needs to develop their activities related to tourism demand in order to better exploit the increasing number of visitors. On the other hand, from a national perspective, they confirm that a tourism specialized economy, like Spain as a whole, presents important revenues even for those less developed tourism regions such as the case of Galicia.

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Appendix

Table 8 - Industries considered in the interregional model

Industry Code	Industry name	Industry Number
AB	Primary sector	R01
CA	Coal and lignite; peat	R02
CB	Other mining and quarrying products	R03
DA	Food products and beverages	R04
DB	Textiles	R05
DC	Wearing apparel; furs and leather	R06
DD	Wood and products of wood and cork	R07
DE	Pulp, paper and paper products	R08
DF	Coke, refined petroleum products and nuclear fuels	R09
DG	Chemicals	R10
DH	Rubber and plastic products	R11
DI	Other non-metallic mineral products	R12
DJ	Metallurgy and other basic metals	R13
DK	Machinery and equipment	R14
DL	Electrical, precision and optical instruments	R15
DM	Motor vehicles, and other transport equipment	R16
DN	Other manufactured goods	R17
E	Electrical energy, gas, steam and hot water	R18
F	Construction work	R19
G	Trade and repair services	R20
HA	Accommodation services	R21
HB	Restaurant services	R22
I	Transport and communicating services	R23
J	Financial intermediation services	R24
K	Real estate services	R25
L	Public administration and defence services	R26
M	Education services	R27
N	Health and social work services	R28
O	Other services	R29
P95	Private households with employed persons	R30

Figure 12 - Overview of the method for the estimation of the Galician and ROC tourism consumption vectors

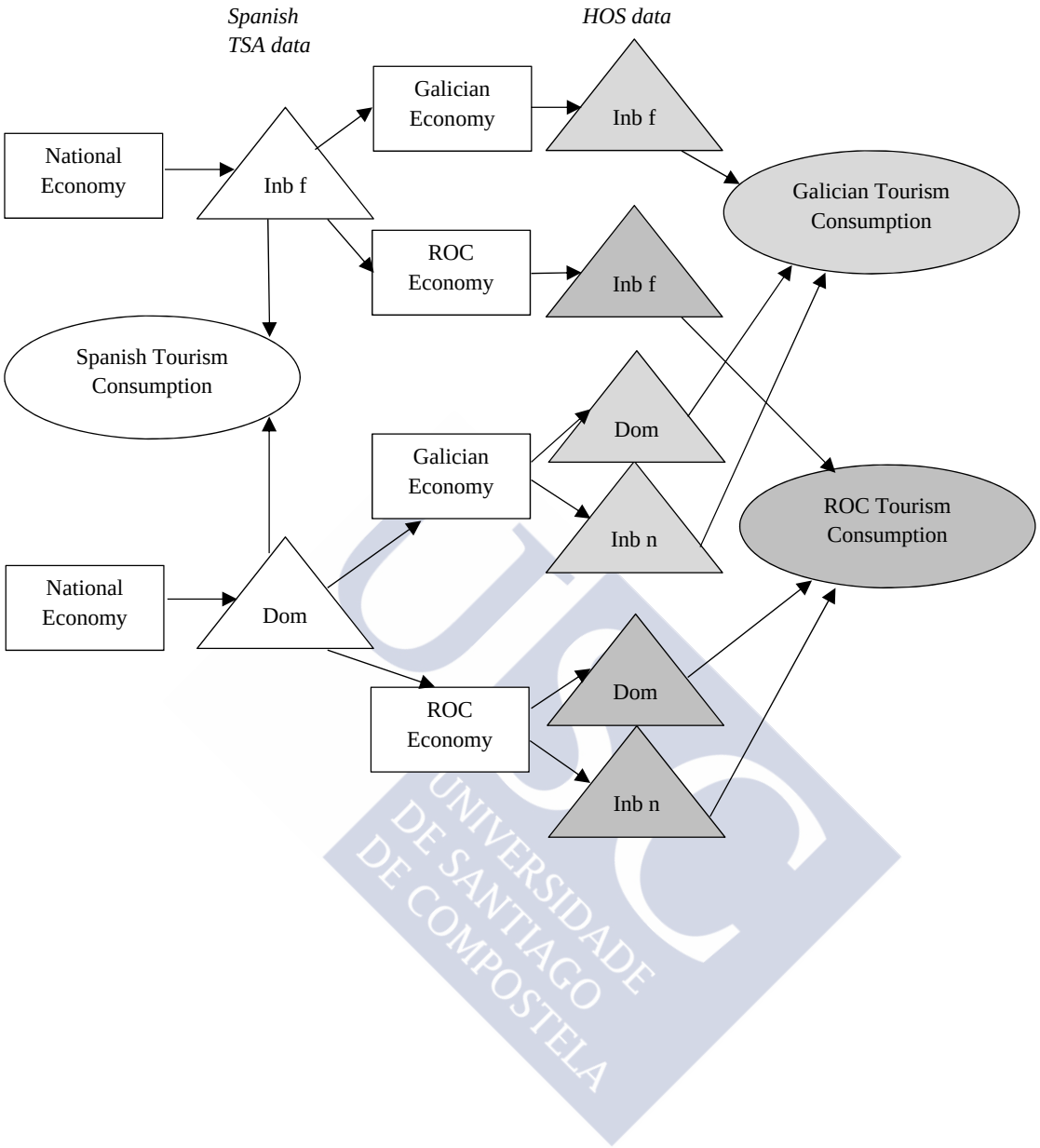

Table 9 – Interregional table (Millions of euros) (Part 1: Galician intermediate inputs).

	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	Total
R01	42	0	0	1,222	3	1	95	19	0	3	0	0	0	0	0	0	0	0	14	99	9	85	4	0	1	6	0	4	3	0	1,611
R02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134	0	0	0	0	0	0	0	0	0	0	0	0	134
R03	0	0	12	1	0	0	0	0	0	13	0	86	3	0	0	1	0	0	65	1	0	0	0	0	0	0	0	0	1	0	183
R04	444	0	0	653	2	1	0	0	0	5	0	0	0	0	0	0	0	0	0	15	20	476	2	0	0	2	3	18	10	0	1,649
R05	2	0	0	0	86	1	0	0	0	0	0	0	0	0	0	49	0	0	0	1	0	0	0	0	0	0	0	0	16	0	157
R06	1	0	0	1	3	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	0	0	1	0	1	1	0	13
R07	1	4	2	8	0	0	234	23	0	4	1	9	6	4	0	10	60	0	122	10	2	11	0	0	0	0	0	0	14	0	526
R08	0	0	1	55	3	1	15	46	0	5	7	4	4	2	0	4	3	7	3	22	1	6	5	8	12	22	8	6	146	0	394
R09	50	1	12	19	1	0	6	1	17	50	8	13	22	1	0	9	1	122	15	27	2	11	113	2	0	6	3	5	14	0	532
R10	35	0	3	9	17	2	75	30	0	53	19	16	19	4	0	19	8	6	31	8	1	14	1	0	0	0	0	20	25	0	415
R11	5	0	1	31	1	0	4	3	0	9	45	3	3	12	1	156	8	0	19	4	0	2	5	0	2	0	0	1	6	0	320
R12	0	0	4	3	0	0	0	0	0	6	0	45	12	1	0	4	2	0	694	1	0	0	2	0	0	0	0	0	2	0	776
R13	5	1	1	109	0	0	4	2	1	5	6	4	333	29	61	430	27	5	429	7	0	1	1	0	9	0	0	0	2	0	1,473
R14	7	2	6	9	4	0	6	3	7	8	4	11	32	11	11	88	3	30	57	6	1	8	9	0	0	4	1	2	9	0	337
R15	5	0	5	11	0	0	8	1	6	0	0	9	12	9	10	101	0	0	67	6	0	0	8	0	0	4	0	16	8	0	288
R16	24	0	0	9	0	0	0	0	0	0	0	0	0	0	0	498	0	0	0	4	0	0	16	0	0	5	0	0	2	0	558
R17	0	0	0	0	0	0	0	1	0	1	0	0	62	1	0	3	50	2	111	15	1	54	4	3	1	5	7	4	67	0	390
R18	58	10	15	61	9	1	34	13	7	19	12	32	300	18	10	96	6	535	35	246	9	63	71	12	15	69	28	22	107	0	1,912
R19	33	0	10	27	2	1	5	2	0	1	2	19	15	14	7	12	1	48	4,972	109	21	14	63	28	734	71	22	31	103	0	6,370
R20	90	0	8	220	105	1	54	17	2	12	17	55	74	9	21	162	33	13	403	287	3	293	121	5	106	45	6	214	24	0	2,403
R21	0	0	0	2	0	1	1	0	2	2	1	1	3	3	0	4	1	3	4	7	1	0	11	3	0	1	0	1	11	0	64
R22	1	0	0	1	0	0	0	0	1	3	1	0	2	1	0	5	1	4	7	18	0	1	13	6	1	10	18	21	47	0	165
R23	50	2	43	252	49	1	97	40	30	53	28	164	166	26	21	142	33	83	156	568	11	49	922	53	238	131	22	32	77	0	3,541
R24	47	0	5	81	20	1	14	8	21	13	7	14	30	15	0	84	7	55	98	187	13	62	122	396	193	35	9	25	113	0	1,675
R25	21	7	18	141	53	1	24	24	15	63	37	55	51	22	61	197	23	122	218	1,158	68	257	272	153	993	243	30	162	89	0	4,576
R26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R27	1	0	0	2	0	1	0	0	0	1	0	0	4	1	0	5	0	2	2	13	1	4	2	1	10	10	8	1	19	0	89
R28	27	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	14	3	6	6	2	1	7	1	107	10	0	187
R29	8	1	1	58	28	1	4	14	9	34	15	20	34	13	11	12	4	58	118	44	22	47	48	27	315	12	17	45	167	0	1,184
R30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	955	30	147	2,984	387	17	681	248	117	364	210	559	1,190	196	215	2,091	272	1,230	7,641	2,876	191	1,465	1,821	702	2,629	690	183	737	1,093	0	31,920

	GAL	ROC	Intermediate demand	Final demand	Total Output	GVA	Employment
GAL							
ROC							

Table 10 – Interregional table (Millions of euros) (Part 2: Galician intermediate imports from ROC).

	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	Total
R01	11	0	0	219	3	0	21	4	0	1	0	0	0	0	0	0	0	0	0	2	3	23	0	0	0	0	0	0	0	0	288
R02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R03	0	0	0	0	0	0	0	0	0	1	0	6	10	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	20
R04	23	0	0	528	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	9	13	476	2	0	0	1	2	10	4	0	1,072
R05	6	0	0	2	436	0	1	4	0	1	19	1	0	0	0	20	27	0	0	15	2	25	0	0	0	0	0	5	5	0	568
R06	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	2	1	0	4	3	0	2	1	0	0	2	0	1	9	0	92
R07	0	0	0	0	0	0	28	1	0	0	0	0	0	0	0	0	8	0	7	0	0	0	0	0	0	0	0	0	1	0	45
R08	0	0	1	106	8	0	29	104	0	10	9	7	7	4	0	6	6	9	4	26	1	9	8	14	134	29	12	9	87	0	641
R09	59	1	14	22	1	0	7	2	19	58	9	15	26	1	0	9	1	62	17	32	2	13	131	2	0	7	3	5	16	0	535
R10	15	0	3	14	27	1	27	6	0	158	35	20	39	6	0	23	12	9	29	8	2	22	1	1	0	0	0	97	28	0	584
R11	11	0	2	74	4	1	9	7	0	22	106	6	7	13	17	75	22	0	46	11	1	5	17	0	4	1	0	2	13	0	476
R12	0	0	4	28	0	0	1	0	0	9	1	104	21	3	2	30	3	0	394	7	1	20	5	0	0	0	0	4	9	0	649
R13	22	2	1	45	2	0	9	3	3	4	15	9	536	112	101	674	93	38	210	8	1	10	4	1	3	0	0	2	22	0	1,931
R14	5	1	7	11	3	1	5	8	3	3	2	12	20	23	22	31	2	17	74	7	1	6	28	2	1	4	2	1	21	0	322
R15	11	0	5	12	1	1	7	3	5	3	2	6	30	21	20	32	2	20	68	11	0	7	19	0	0	13	1	55	22	0	379
R16	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	176	0	0	0	25	0	0	2	0	0	2	0	0	1	0	209
R17	0	0	0	0	0	0	0	0	0	1	0	0	30	0	0	3	16	1	27	9	2	19	2	2	41	7	6	3	13	0	182
R18	0	0	1	21	3	1	5	8	0	29	1	25	14	1	0	6	0	218	1	5	1	5	1	1	0	2	3	3	9	0	367
R19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R20	10	0	1	20	7	0	7	2	0	1	1	6	8	3	0	4	3	0	4	17	0	0	16	0	0	1	0	0	3	0	116
R21	0	0	0	5	2	0	2	1	4	4	2	1	8	6	0	9	2	9	9	15	2	1	78	8	0	11	1	2	26	0	209
R22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
R23	17	0	6	33	8	0	11	5	5	13	4	18	33	7	0	14	5	8	21	130	2	3	328	8	5	22	1	4	42	0	755
R24	4	0	0	7	1	0	1	1	2	1	1	1	3	1	0	7	1	5	9	17	1	6	11	132	104	3	1	2	10	0	333
R25	4	1	3	94	15	0	4	17	5	30	4	9	24	11	0	41	7	54	131	116	3	19	124	60	214	30	6	12	42	0	1,083
R26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	5
R30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	199	6	49	1,243	586	8	175	177	45	352	211	246	818	215	164	1,162	213	452	1,058	475	38	672	780	230	507	136	39	217	387	0	10,862
Total inputs	1,154	36	196	4,227	974	25	856	425	162	716	422	804	2,008	411	379	3,253	486	1,682	8,699	3,351	230	2,137	2,601	932	3,137	826	222	954	1,480	0	42,782

	GAL	ROC	Intermediate demand	Final demand	Total Output	GVA	Employment
GAL							
ROC							

Table 11 – Interregional table (Millions of euros) (Part 3: Galician intermediate exports to ROC).

	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	Total	Total intermediate demand
R01	47	0	0	456	7	2	12	10	0	2	4	0	0	0	0	0	0	0	1	14	5	28	1	0	0	3	1	2	14	0	608	2,219
R02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134
R03	0	0	1	1	0	0	0	1	0	16	0	74	18	1	0	0	0	0	75	1	0	0	2	0	0	0	0	0	3	0	194	377
R04	79	0	0	233	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	2	16	213	1	0	0	4	3	10	4	0	570	2,219
R05	1	0	0	1	31	19	0	1	0	0	2	0	0	0	0	4	2	0	0	1	0	5	0	0	0	1	0	1	9	0	81	237
R06	0	0	0	1	0	1	0	0	0	0	0	0	1	1	0	1	0	0	2	0	0	0	0	0	0	1	0	1	1	0	12	25
R07	5	4	1	27	0	3	129	24	0	2	2	11	13	8	0	5	126	0	191	8	2	22	15	0	0	0	0	0	20	0	622	1,147
R08	0	0	0	4	0	0	0	11	0	1	0	1	0	1	0	0	3	1	1	2	0	1	2	2	1	3	1	1	30	0	68	462
R09	18	1	8	6	0	1	2	2	156	68	5	12	8	3	0	2	1	83	14	19	2	16	209	3	2	8	7	13	15	0	681	1,212
R10	19	1	4	11	5	3	4	18	0	19	22	18	40	12	0	7	5	10	21	8	2	17	6	1	1	3	0	39	25	0	322	737
R11	3	0	1	26	0	5	0	3	0	11	45	2	5	17	1	40	9	0	31	5	0	2	10	0	2	0	0	1	9	0	228	548
R12	0	0	0	8	0	0	0	0	0	1	0	33	3	2	1	4	1	0	232	1	0	1	4	0	0	0	0	1	1	0	293	1,069
R13	24	1	6	36	1	2	5	19	1	1	9	26	361	226	3	167	115	16	368	10	0	5	4	0	2	2	1	1	20	0	1,431	2,904
R14	1	0	1	1	1	1	1	1	1	2	1	3	4	16	1	1	1	3	24	3	0	1	7	0	0	4	1	1	3	0	81	418
R15	1	0	0	3	0	0	0	1	0	2	0	3	4	12	1	2	1	3	21	2	0	3	6	0	1	2	0	4	2	0	78	366
R16	3	0	0	1	0	0	0	0	0	0	0	1	0	0	0	417	4	0	0	227	0	2	71	0	0	20	0	0	12	0	760	1,318
R17	0	0	0	0	0	0	0	1	0	0	0	0	18	0	0	0	1	0	7	1	0	3	3	0	0	1	1	0	10	0	47	437
R18	20	3	8	39	6	4	6	24	3	29	16	39	49	19	1	21	4	213	16	129	5	13	56	8	12	38	15	16	66	0	878	2,790
R19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,370
R20	23	0	2	36	5	9	8	12	2	10	6	12	26	18	3	17	12	10	94	61	2	43	43	2	3	15	4	24	40	0	542	2,945
R21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
R22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	165
R23	2	0	2	21	2	2	2	6	3	9	3	15	13	5	0	5	3	5	13	42	1	4	99	5	5	9	2	3	31	0	313	3,854
R24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	5	4	0	0	0	1	0	17	1,692
R25	0	0	1	11	1	1	1	5	1	5	2	4	5	4	1	6	1	5	12	22	2	3	18	7	6	8	2	7	33	0	173	4,749
R26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
R28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187
R29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	12	1,197
R30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	247	12	34	923	60	57	171	139	167	182	118	254	567	345	11	700	291	348	1,125	561	39	384	556	33	39	122	38	126	361	0	8,010	39,931

	GAL	ROC	Intermediate demand	Final demand	Total Output	GVA	Employment
GAL							
ROC							

Table 12 – Interregional table (Millions of euros) (Part 4: ROC intermediate inputs).

	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	Total	Total ID
R01	1,906	0	0	17,506	304	85	366	385	0	63	180	0	0	0	0	1	3	0	8	474	192	1,044	17	2	5	98	46	86	568	0	23,337	23,625
R02	0	3	14	0	0	0	0	0	64	17	0	4	188	0	0	0	0	555	0	6	0	1	7	3	4	20	1	1	15	0	902	902
R03	7	1	6	24	1	0	0	15	0	286	2	1,253	310	10	0	0	6	0	1,301	16	2	1	28	0	1	0	0	0	55	0	3,327	3,346
R04	5,257	0	0	15,673	208	97	0	18	0	110	0	0	0	0	0	0	1	0	0	85	1,111	14,453	70	1	0	263	196	698	292	0	38,534	39,606
R05	48	0	0	136	2,561	1,155	8	95	0	36	360	40	74	196	9	523	217	1	501	228	42	808	339	2	0	239	8	370	986	0	8,982	9,550
R06	16	6	0	19	302	628	10	11	0	12	15	5	6	5	2	11	42	15	18	15	28	7	5	1	1	4	33	6	5	0	1,230	1,323
R07	66	48	14	344	5	43	1,437	295	0	25	29	130	160	107	4	55	1,584	0	2,382	101	25	274	202	1	0	2	1	2	252	0	7,589	7,634
R08	51	2	8	1,163	63	48	67	3,414	16	409	129	191	106	191	19	103	972	286	279	541	26	298	501	599	8,400	914	411	352	1,423	0	20,983	21,624
R09	276	17	135	83	5	13	27	37	3,242	1,332	87	215	115	62	1	15	16	1,558	269	344	28	309	4,153	55	35	153	142	258	292	0	13,274	13,809
R10	768	56	183	431	160	104	82	736	1	603	875	735	1,665	506	20	241	196	398	839	344	69	698	258	21	46	124	21	1,532	1,018	0	12,730	13,314
R11	134	8	30	1,347	25	277	14	169	2	555	2,342	130	250	878	53	1,966	494	1	1,650	257	10	119	516	7	91	6	14	64	454	0	11,862	12,337
R12	1	5	8	710	11	1	15	2	0	82	18	2,773	254	141	46	301	40	1	19,392	87	15	83	329	1	0	0	7	78	74	0	24,477	25,126
R13	812	47	194	1,078	27	69	151	636	35	19	304	880	11,562	3,485	4,092	4,642	3,840	510	12,059	346	8	150	127	9	69	79	39	20	650	0	45,940	47,871
R14	128	7	64	135	42	28	42	120	31	311	34	645	729	1,120	227	38	124	188	2,928	358	61	601	283	36	10	500	85	104	638	0	9,617	9,938
R15	150	13	58	326	63	47	54	98	99	346	25	456	467	820	2,367	231	205	767	2,820	1	0	1	1,002	1	0	0	14	559	22	0	11,013	11,392
R16	27	5	6	6	0	0	2	0	1	6	0	19	5	2	0	7,801	90	2	2	4,575	2	38	1,421	0	0	395	5	10	248	0	14,667	14,876
R17	1	0	5	12	1	7	0	132	1	21	2	10	4,509	97	5	62	275	39	1,668	129	81	599	624	82	1,015	121	199	71	1,415	0	11,184	11,366
R18	688	95	282	1,396	223	146	190	897	92	1,038	588	1,427	1,527	696	37	706	141	7,307	587	4,651	197	441	2,055	303	1,426	1,378	528	573	1,367	0	30,982	31,348
R19	172	4	56	551	45	8	14	120	32	140	27	237	212	82	13	69	105	504	92,975	1,839	590	576	2,126	606	12,577	472	585	515	1,779	0	117,031	117,031
R20	2,164	22	180	3,348	1,049	181	690	1,135	210	944	610	1,168	2,507	1,732	257	1,563	1,181	969	8,866	5,732	208	3,998	4,140	145	2,281	1,449	359	2,197	1,809	0	51,097	51,213
R21	10	1	2	63	0	3	8	25	5	126	19	20	75	32	1	48	11	31	199	225	6	13	1,680	256	35	171	49	84	823	0	4,024	4,233
R22	4	1	1	17	2	0	0	11	2	81	6	4	16	3	1	12	7	11	28	106	15	21	122	111	13	188	149	383	525	0	1,839	1,840
R23	442	50	413	5,407	834	270	393	1,570	736	2,368	788	3,735	3,171	1,288	92	1,262	641	1,194	3,271	10,408	336	1,005	25,063	1,311	7,154	2,291	431	782	1,826	0	78,533	79,288
R24	454	13	34	858	137	136	65	280	178	344	194	294	651	434	28	319	150	546	2,185	2,903	121	1,082	1,463	8,796	7,056	584	188	424	2,165	0	32,083	32,416
R25	99	96	225	5,947	771	234	262	2,244	642	2,354	966	1,353	2,421	307	2,255	2,340	715	2,445	7,556	21,454	1,516	4,545	10,928	4,236	21,822	4,454	639	4,290	3,560	0	110,676	111,759
R26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R27	25	3	4	186	27	32	16	68	36	136	40	52	233	45	1	80	16	90	54	281	17	80	120	23	19	51	82	86	276	0	2,177	2,177
R28	228	1	5	174	20	0	16	25	9	65	23	24	9	20	4	64	25	38	0	619	73	100	227	42	25	90	39	3,096	558	0	5,618	5,618
R29	9	2	93	875	107	93	81	464	90	694	209	916	452	268	78	702	236	246	1,211	1,126	322	107	216	519	2,910	257	789	523	1,639	0	15,236	15,241
R30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13,942	506	2,021	57,816	6,993	3,703	4,012	13,002	5,526	12,522	7,871	16,717	31,675	12,528	9,611	23,157	11,332	17,702	163,048	57,254	5,103	31,453	58,021	17,169	64,994	14,304	5,062	17,165	24,735	0	708,943	719,805
Total I	14,189	518	2,055	58,739	7,053	3,760	4,183	13,141	5,693	12,703	7,989	16,971	32,242	12,873	9,623	23,856	11,623	18,050	164,173	57,815	5,142	31,837	58,577	17,202	65,032	14,426	5,100	17,291	25,096	0	716,953	759,736

	GAL	ROC	Intermediate demand	Final demand	Total Output	GVA	Employment
GAL							
ROC							

Table 13 – Interregional table (Millions of euros and full-time equivalent jobs) (Part 5: Macroeconomic variables).

	Intermediate demand	Final Demand	Total output	GVA	Employment
R01	1,611	2,178	3,789	2,252	110,778
R02	134	13	147	103	443
R03	183	314	497	228	6,458
R04	1,649	4,158	5,808	1,113	29,535
R05	157	1,875	2,031	630	20,698
R06	13	22	35	9	451
R07	526	1,148	1,674	437	13,774
R08	394	445	839	316	7,589
R09	532	1,473	2,005	309	649
R10	415	777	1,192	272	3,831
R11	320	366	686	173	4,477
R12	776	647	1,424	458	13,713
R13	1,473	2,234	3,706	992	23,180
R14	337	359	696	236	7,686
R15	288	525	812	214	4,411
R16	558	6,799	7,357	1,439	28,900
R17	390	524	914	248	11,273
R18	1,912	1,206	3,118	1,180	3,786
R19	6,370	8,574	14,944	5,463	137,547
R20	2,403	6,042	8,444	4,796	165,293
R21	64	571	635	389	7,933
R22	165	4,608	4,773	2,274	53,718
R23	3,541	2,161	5,702	2,609	53,212
R24	1,675	1,017	2,692	1,616	20,643
R25	4,576	4,659	9,235	6,052	80,061
R26	0	3,792	3,792	2,690	70,058
R27	89	2,468	2,557	2,254	54,577
R28	187	3,460	3,646	2,348	58,456
R29	1,184	1,927	3,111	1,542	45,678
R30	0	364	364	364	46,172
Total Galicia	31,920	64,707	96,627	43,006	1,084,980
R01	23,337	16,238	39,575	23,759	805,222
R02	902	212	1,115	466	10,257
R03	3,327	697	4,024	1,581	21,442
R04	38,534	43,303	81,836	16,826	397,665
R05	8,982	6,199	15,182	4,390	185,002
R06	1,230	4,345	5,575	1,495	66,149
R07	7,589	1,036	8,625	2,473	93,726
R08	20,983	9,649	30,632	11,524	220,811
R09	13,274	15,210	28,484	3,430	7,751
R10	12,730	27,316	40,046	11,747	157,569
R11	11,862	6,196	18,057	5,301	117,023
R12	24,477	5,958	30,435	10,245	193,887
R13	45,940	19,676	65,616	20,040	436,820
R14	9,617	14,922	24,539	9,077	203,614
R15	11,013	16,001	27,014	6,918	165,289
R16	14,667	44,196	58,863	12,096	258,300
R17	11,184	9,788	20,972	6,345	230,527
R18	30,982	11,379	42,360	15,493	71,814
R19	117,031	145,828	262,859	88,345	2,250,453
R20	51,097	96,692	147,789	82,337	2,622,707
R21	4,024	11,758	15,782	10,098	241,735
R22	1,839	80,219	82,058	48,231	925,114
R23	78,533	48,385	126,918	53,647	959,788
R24	32,083	25,618	57,701	36,083	348,857
R25	110,676	87,963	198,639	128,027	1,512,839
R26	0	66,604	66,604	45,843	1,249,142
R27	2,177	40,541	42,718	36,675	893,823
R28	5,618	60,656	66,275	42,564	1,062,844
R29	15,236	40,162	55,398	28,994	746,022
R30	0	6,721	6,721	6,721	428,928
Total ROC	708,943	963,467	1,672,410	770,770	16,885,120
Total Spain	740,863	1,028,174	1,769,037	813,776	17,970,100

	GAL	ROC	Intermediate demand	Final demand	Total Output	GVA	Employment
GAL							
ROC							

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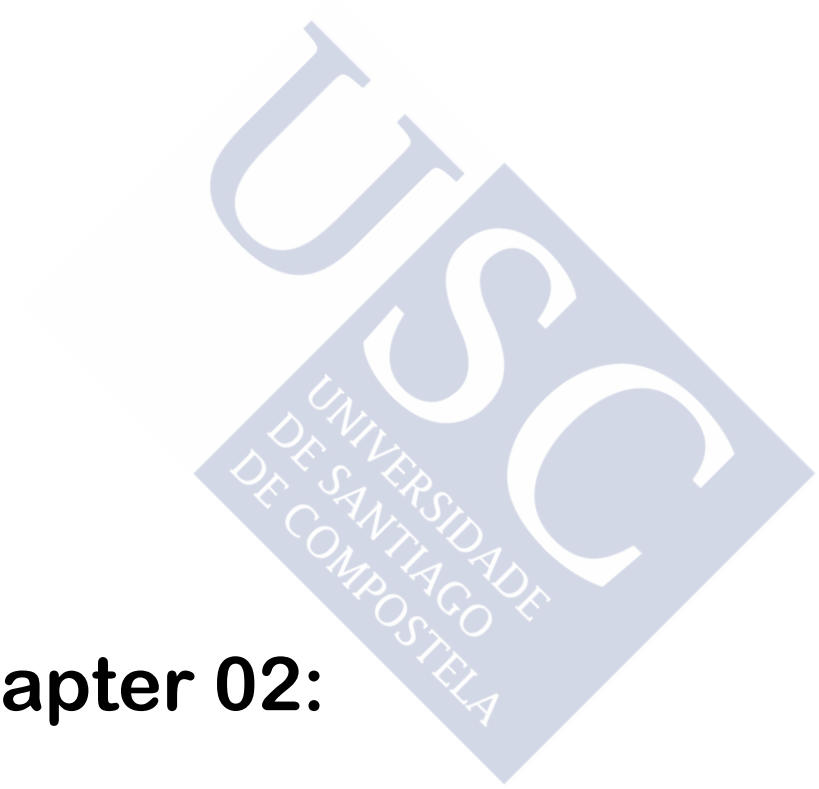

Chapter 02:

SAMGAL-08. A Social Accounting Matrix for Galicia

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1. Introduction

In the year 1965, Richard Stone defined the Social Accounting Matrix (SAM) as a representation of all transactions, actual or imputed, that take place in an economic system. According to Stone, an economic system is characterized as a place where goods and services are produced in order to satisfy society´s needs or demands. This production is carried out by productive agents (farms, stores, industries, etc.) and can be divided into two parts: intermediate production, if it is consumed during the production process, and value added or domestic product. At the same time, the domestic product is essentially intended for two destinations: final consumption or accumulation (future use), which is also part of the wealth of an economy.

Production, consumption, and accumulation are the three basic transactions in a closed economic system. Taking into account flows with the rest of the world, imports must be added on the production side and exports on the demand side. In this regard, these four accounts (production, consumption, accumulation, and rest of the world) define the simple structure of an economy:

$$\textbf{Domestic Production} + \textbf{Imports} = \textbf{Consumption} + \textbf{Investment} + \textbf{Exports}$$

$$\textbf{Resources} = \textbf{Expenditures}$$

The first SAM was developed for the United Kingdom and coordinated by Richard Stone for the Cambridge Growth Project (Stone *et al*., 1962). It was similar to an Input-Output table but focused especially on the disaggregation of the value-added further than the traditional capital and labor classification. Moreover, they integrated the four accounts described above in a single accounting matrix framework. Despite this, Keuning and Ruijter (1988) consider the first comprehensive SAM that of Pyatt and Thorbecke (1976), which included the explanation of its design.

King (1985) specifies two main objectives for the SAMs. Firstly, it can organize information about the economic and social structure of a territory in a year considering the circular flow of income and, secondly, it is the database for the construction of Computable Equilibrium Models (CGEs) or linear SAM models.

As can be found in Fernandez and Gonzalez (2004), taking into account the capability of showing interindustry linkages and income distribution at the same time, initially

SAMs were constructed for developing countries with the objective of assessing policies for the reduction of poverty (Sri Lanka by Pyatt *et al*., 1977; Malaysia by Pyatt and Round, 1984 or Indonesia by Keuning and Thorbecke, 1989; among others). Not long after that, developed countries also started to have their own SAMs for evaluating a wide variety of economic policies (Spain by Kehoe *et al*., 1986; United States by Roland-Host and Sancho, 1992 or Netherlands by Cohen, 1988, among other examples).

The aim of this chapter is to present the first SAM for the Galician region for the year 2008. Its main characteristics are:

- eight different households classified by income level
- two governments (the regional and the central one)
- five types of taxes (income taxes, corporate taxes, value-added taxes, excise taxes, and other taxes on production)
- 29 different productive sectors
- four types of wage-earners classified by education level

The rest of the chapter is divided into five sections. In the next part, we analyse previous Spanish SAMs both at a national and regional level. In the third section, the objective is to describe the methodology and the main data sources used in the elaboration of the Galician SAM. The fourth section presents the SAMGAL-08 in detail. Finally, the last two sections make a brief summary of the results and explain the main conclusions reached through this chapter.

2. Related work

2.1. Previous Spanish SAMs

Although SAMs have been elaborated internationally for more than 50 years, the experience in Spain is relatively recent, but vast, as Table 14 shows.

The first SAM of the Spanish economy was made in 1986 at the Autonomous University of Barcelona (Kehoe *et al*., 1986) with reference to the year 1980. It was later updated using the first Input-Output table in 1986 published by the Spanish National Statistics Office (INE), the final version being the one that appears in Kehoe *et al*. (1988a). It should be noted that the first square version did not appear until 1990 (Polo *et al*. 1990). This SAM was designed with the main purpose of being used in a

CGE model to simulate the effects of the entrance of Spain into the EU and also to assess the economic impact of some policies such as the tax reform of 1986 (Kehoe *et al*., 1988b and 1989; Manresa *et al*., 1988; Polo and Sancho, 1990 and 1993).

Table 14 – Previous Spanish SAMs

Base year	Author/s and year of publication	S	IA	HH	PF
1980	Kehoe, T.; Manresa, A.; Noyola P. and Polo, C. (1986)	12	10	8	3
1980	Kehoe T; Manresa, A.; Polo, C. and Sancho, F. (1988)	12	10	8	3
1980	Polo, C.; Roland-Host, D. and Sancho, F. (1990)	12	10	8	3
1980	Uriel, E. (1990)	12	8	6	2
1990	Uriel, E.; Beneito, P.; Ferri, J. and Moltó, M. (1997)	11	14	12	5
1990	Fernández, M. and Polo, C. (2001)	16	14	12	5
1990	Rubio, M. (2002)	48	33	30	9
2000	Llanes, G. and Rodriguez, C. (2004)	30	4	1	2
1995	Uriel, E.; Beneito, P.; Ferri, J. and Moltó, M. (2005)	13	15	12	6
2000	Lucena, A. and Serrano, M. (2006)	14	3	1	2
2000	Rubio, M. and Vicente, J. (2009)	18	28	25	18
2000	Cardenete, M. and Fuentes, P. (2009)	27	4	1	2
2000	Álvarez, M. (2010)	30	5	1	2

S – Number of Sectors; IA – Institutional Agents; HH – Households; PF – Productive Factors

In this decade, the scheme of the SAMs is quite similar, mainly focused on the analysis of transfers between institutional agents and taxes in order to simulate different fiscal policies. Moreover, these first SAMs were disaggregated in 12 industries, ten institutional agents (among them, eight different types of households), and three productive factors (skilled wage earners, non-skilled wage earners, and net operating surplus/mixed rents).

In the 1990s, Uriel *et al*. (1997) presented the next Spanish SAM, for the year 1990, with the aim of studying the SAM multipliers and the socioeconomic structure of Spain (Ferri and Uriel, 2000). After that, Fernández and Polo (2001) designed a new alternative SAM for the year 1990 (SAM-90) revising the discrepancies with the National Accounts and the lacks in the disaggregation proposed by Uriel *et al*. (1997). Additionally, Rubio (2002) also presented a third SAM (MCSE-90) for the same year.

Since the correction of Fernández and Polo (2001) applies to the Uriel *et al*. (1997) SAM, both schemes were very similar. Among the 14 institutional agents of the SAMs, they considered 12 different households. They also presented five productive factors and 11 industries in the case of Uriel *et al*. and 16 sectors in the Fernández and Polo SAM. Alternatively, Rubio considered 30 types of households, nine productive factors and 48 sectors.

With different household classifications, Uriel *et al*. (2005) estimated a new SAM for the year 1995. This time, the 12 types of households remained and the number of productive factors increased to six, the number of sectors to 13, and the institutional agents to 15.

More recently, for the year 2000, five new Spanish SAMs appeared, although only one of them disaggregated wage earners or the households[10] into several categories. In this sense, Llanes and Rodríguez (2004), as well as Lucena and Serrano (2006), Cardenete and Fuentes (2009), and Álvarez (2010) presented SAMs with one type of household and two production factors (wages and operating surplus). They differ from each other in the number of sectors and the ultimate objective of their SAM. For example, Álvarez (2010) go deeper in the analysis of capital goods distinguishing between six public and six private capital goods based on the data from the Gross Capital Formation Matrix of the Spanish Input-Output framework.

For the same year, 2000, Rubio and Vicente (2009) design a SAM with 18 sectors, 28 institutional agents (among them, 25 types of households), and 18 productive factors (eight different types of wage earners, and six self-employed).

2.2. Previous Regional SAMs in Spain

Originally, this kind of analytical scheme was undertaken at national level, but the growing interest in considering the peculiarities of a sub-national productive structure resulted in SAMs being developed at regional level, too. In this way, several regional SAMs were presented in Spain, for example: for Andalusia (Curbelo, 1990; Cardenete, 1998 or the Andalusia Statistical Office, 2011), for Catalonia (Llop and Manresa, 1999), for Extremadura (De Miguel, 2004), Asturias (Argüelles and Benavides, 2004), Castile and Leon (Rubio, 1995), Aragon (Flores and Mainar, 2005), and the Balearic Islands (Polo and Valle, 2007) as shown Table 15.

[10] As explained by Fernandez and Manrique de Lara (2003), among others, when the labor market or the households are not disaggregated, it is not essentially a SAM. Therefore, a National Accounting Matrix (NAM), can be defined as the representation of the National Accounts in a matrix format, traditionally in a double-entry accounting way.

Table 15 - Previous Regional SAMs in Spain

Base year	Author/s and year of publication	Region	S	IA	HH	PF
1980	Curbelo, J. (1988)	Andalusia	23	8	5	2
1985	Rubio, M. (1995)	Castile and Leon	10	12	10	2
1990	Cadenete, M. (1998)	Andalusia	25	2	1	2
1994	Llop, M. and Manresa, A. (1999)	Catalonia	17	2	1	2
1990	De Miguel, F. and Manresa, A. (2004)	Extremadura	17	13	11	2
1995	Argüelles, M. and Benavides, C. (2004)	Asturias	4	3	1	2
1999	Flores, M. and Mainar, A. (2005)	Aragon	26	11	9	2
1997	Polo, C. and Valle, E. (2007)	Balearic Islands	54	4	1	2
2005	Andalusia Statistical Office (2011)	Andalusia	37	6	3	11

S – Number of Sectors; IA – Institutional Agents; HH – Households; PF – Productive Factors

Chronologically, the first SAM was made by Curbelo for the Andalusian economy for the year 1980 (SAMA-80). This SAM considered 23 sectors, two productive factors and eight institutional agents (among them five types of households and two types of enterprises). Following a similar scheme, Rubio (1995) presented a SAM for Castile and Leon for the year 1985, which distinguishes between ten different households and ten industries.

Later in the 1990s, a total of six regional SAMs appeared, although just two of them disaggregated the income distribution process: the one of Extremadura for the year 1990 and the one of Aragon for the year 1999.

The last regional SAM, to our knowledge, was published by the Andalusian Statistical Office (2011). It shows 37 sectors, six institutional agents (among them three different households disaggregated by kind of income), and 11 productive factors (eight different types of wage earners by gender and skills, two types of self-employed workers by gender and net operating surplus).

3. Methodology of construction

This economy-wide framework is mainly based on the accounting identity rule which implies that total revenues must be equal to total expenses for each account. Therefore as Table 16 shows, the following macroeconomic identities can be described:

1st Account - **Production** $Aggregate\ Demand = Aggregate\ Supply$

2nd Account **- Productive Factors** $Gross\ Value\ Added = Primary\ Regional\ Income$

3rd Account - **Institutional Agents** $Total\ Disposable\ Income = Total\ Expenses$

4th Account - **Other Institutional Agents** $Total\ Taxes = Government\ Revenues$

5th Account - **Capital Formation** $Savings = Investment$

6th Account - **Foreign Agents** $Total\ Foreign\ Revenues = Total\ Foreign\ Payments$

The SAMGAL-08 is constructed following the same basic scheme as seen in Pyatt and Round (1979, 1985, 2012), Thorbecke (1998) and Miller and Blair (2009). It means five accounts (with an extra institutional account for taxes) more focused on the income distribution process (first 3-4 accounts) considering the saving-investments and the foreign account exogenous.

Table 16 - Scheme of a basic SAM.

	Production Account	*Factors Account*	*Institutional Account*	*Other Institutional Accounts*	*Saving-Investment Account*	*Foreign Accounts*	**Total**
Production Account	Intermediate Production in pp.	0	Households and Government Consumption	0	Investment	Exports and Inbound Tourism	**AD**
Factors Account	Wages, Social Contributions and Gross Operating Surplus	0	0	0	0	0	**GVA**
Institutional Account	0	Allocation of factor incomes	Current Transfers Between Institutional Agents	Government Revenues from Taxes	0	Transfers from the Foreign Sector	**TI**
Other Institutional Accounts	Value Added Tax, Excise Taxes and Other Production Taxes	0	Income Taxes and Other Direct Taxes	0	0	0	**TT**
Saving-Investment Account	0	0	Domestic Savings	0	0	Foreign Savings	**S**
Foreign Accounts	Imports and Outbound Tourism	0	Transfers to the Foreign Sector	0	0	0	**TFR**
Total	**AS**	**PRI**	**TE**	**GVR**	**I**	**TFP**	

AS – Aggregated Supply; AD – Aggregated Demand; PRI – Primary Regional Income; GVA – Gross Value Added; TE – Total Expenses of the Institutional Agents; TI – Total Disposable Income of the Institutional Agents; GVR – Government Revenues from Taxes; TT – Total taxes; I – Investment; S – Savings; TFP – Total Foreign Payments; TFR – Total Foreign Revenues.

It should also be stated that a SAM is a framework that integrates different data sources. In the case of the SAMGAL-08: the Galician input-output framework (as the primary data source and our starting point), regional and national accounts, living conditions survey, wage structure survey, household budget survey, and government budgets among others.

4. The SAMGAL-08: main characteristics and data sources

A general description of the SAMGAL-08 is presented in Table 19. Thus, regional accounts are offered in a matrix form, replacing the traditional double entry in T, as well as facilitating the inclusion of additional information of the flows indicating who pays and who receives them. By convention, each account is represented by a row-column pair, in a way that rows show resources and columns show expenditures.

In the first part of this section we are going to present the different categories used for sectors, productive factors, and institutional agents included in the SAMGAL-08. Then, we describe the principal meaning and how each account of this SAM is done.

Productive sectors

In the case of the productive sectors (Table 17), we decided to distinguish between 29 different types based on the structure of the Galician Input-Output framework of 2008 (MIOGA08) elaborated by the Galician Statistical Institute (IGE).

Table 17 – Sectors included in the SAMGAL-08

Sector Code	Activities
1	Primary sector
2	Mining and quarrying products
3	Food products and beverages
4	Textiles, furs, and leather
5	Wood and products of wood and cork
6	Pulp, paper, and paper products
7	Coke, refined petroleum products, and nuclear fuels
8	Chemicals, rubber, and plastic products
9	Other non-metallic mineral products
10	Metallurgy and other basic metals
11	Machinery and equipment
12	Electrical, precision, and optical instruments
13	Motor vehicles, and other transport equipment
14	Electrical energy, gas, steam, and hot water
15	Other manufactured goods
16	Construction work
17	Trade and repair services
18	Transport and communication services
19	Accommodation services
20	Restaurant services
21	Financial intermediation services
22	Real estate services
23	Rental services
24	Other firm services
25	Public administration and defence services
26	Education services
27	Health and social work services
28	Cultural and sport services
29	Other services

Source: Input-Output framework 2008, IGE.

The main constraint for the number of sectors that were considered appears in the distribution of the generated wages between levels of education.

Productive factors

The productive factors were divided into two groups: wage earners and self-employed workers and capital revenues (gross operating surplus/gross mixed rents). At the same time, wage earners were disaggregated in four different categories depending on their level of education (Table 18). This classification was made using the Wage Structure Survey of the year 2006 published by the National Statistical Institute (INE).

Table 18 – Productive factors considered in the SAMGAL-08.

Productive factor	CNED Code	Type of education
Wage 1	80	No education
	11 and 12	Primary studies
Wage 2	21, 22 and 23	Secondary studies first stage
Wage 3	31, 32, 33, 34, 36 and 41	Secondary studies second stage
Wage 4	51, 52, 53, 54, 55, 56 and 61	University studies

Source: Wage Structure Survey 2006, INE.

Institutional sectors

Despite the fact that 5 institutional sectors are considered in the SEC-95 (non-financial corporations, financial corporations, public administration, households, and non-profit organizations), in the SAMGAL-08, we only distinguish between three of them: corporations, public administration and households.

However, we classify the households into eight different types depending on their income level[11] (representing each one more or less the 12,5% of the total households). For this disaggregation, we use information from the Living Conditions Survey of Galicia (IGE) and the Household Budget Survey (INE) both for the year 2008. As Table 20 shows, low-income households obtain their income from social benefits while high-income households gain more revenues from wages and mixed rents.

[11] As stated in the SCN93, the criteria for classification must be socioeconomic. However, there are several possible alternatives such as: location, size and composition of households, main economic activity, or level of income among others.

Table 19 - General description of the SAMGAL-08

	Production	Wages	SSC	GOS/GMR	HH	Enterprises	Central Government	Regional Government	Direct Taxes	VAT	Excise taxes	Other taxes on production	S-I Account	RO Spain	RO Europe	RO World	TC
Production	Interm. Production in pp.	0	0	0	FC	0	FC	FC	0	0	0	0	I	X to ROC	X to ROE	X to ROW	IT
Wages	Wages	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSC	SSC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOS/GMR	GOS/GMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HH	0	Allocation of wages	Allocation of SSC	Allocation of GMR	0	Compensation for insurance	Social benefits	Other Social benefits	0	0	0	0	0	0	0	0	0
Enterprises	0	0	0	Allocation of GOS	Accident insurance payments	0	0	Transfers to corporations	0	0	0	0	0	0	0	0	0
Central Government	0	0	0	0	SC	0	0	Transfers between Governments	Share of the DT	Share of VAT	Share of the ST	Share of OPT	0	0	0	0	0
Regional Government	0	0	0	0	Other current transfers	Transfers from corporations	Transfers between Governments	0	Share of the DT	Share of VAT	Share of the ST	Share of OPT	0	0	Current transfers from the ROE	0	0
Direct Taxes	0	0	0	0	Income taxes	Corporation tax	0	0	0	0	0	0	0	0	0	0	0
VAT	VAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excise taxes	ST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other taxes on production	OPT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S-I Account	0	0	0	0	Households Savings	Enterprises Savings	Government savings (central)	Government Savings (regional)	0	0	0	0	0	Foreign Savings (ROC)	Foreign Savings (ROE)	Foreign Savings (ROW)	Foreign Savings (TC)
RO Spain	M from the ROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RO Europe	M from the ROE	0	0	0	0	0	0	Current transfers to the ROE	0	0	0	0	0	0	0	0	0
RO World	M from the ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TC	OT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 20 – Households included and type of income

Type of household	Income per month	Wages	Mixed Rents	Social benefits	Total
Household 1	Between 0 and 780€	7.10%	9.15%	83.76%	100.00%
Household 2	Between 781 and 1200€	24.42%	23.23%	52.35%	100.00%
Household 3	Between 1201 and 1450€	31.32%	20.79%	47.89%	100.00%
Household 4	Between 1451 and 1750€	40.79%	25.80%	33.41%	100.00%
Household 5	Between 1751 and 2200€	49.19%	24.68%	26.13%	100.00%
Household 6	Between 2201 and 2700€	53.94%	22.85%	23.21%	100.00%
Household 7	Between 2701 and 3500€	51.61%	29.92%	18.47%	100.00%
Household 8	More than 3501€	52.86%	34.15%	12.99%	100.00%
Total		45.65%	27.05%	27.31%	100.00%

Source: Living Conditions Survey of Galicia 2008, IGE.

Finally, we also differentiate between central government (which includes Central and Social Security administrations) and regional government (both regional and local administrations). Moreover, five types of taxes are included: income taxes, corporation tax, value added tax (VAT), excise taxes, and other production taxes (OPT).

4.1. Production account

The first account of the SAMGAL-08 describes how the goods and services produced meet the aggregated demand. Thus, it represents the basic macroeconomic identity:

$$\boldsymbol{V + M + IT = Y + I + X} \qquad (16)$$

On the supply side, V is the regional primary income generated, M are the imports, and IT the indirect taxes. On the demand side, Y stands for final consumption, I is the investment, and X are the exports.

We have used the MIOGA08 of the IGE as the starting point and the key source for the construction of this SAM. Concretely, in the production account we are describing the same information that appears in the symmetric input-output framework. Using data from the destination matrix, we make a RAS adjustment of the intermediate consumption matrix in order to show the flows in purchases prices.

4.2. Factors account

In the second account, the generation of the primary income is represented, relating the labor market with the social accounting of the institutional agents. Thus, by rows (resources) we have the gross value added divided into wages, social security

contributions, and gross operating surplus. By columns, the total regional primary income appears allocated by institutional sectors.

The main database used for the distribution of the wages between the different types of wage earners is the Wage Structure Survey of the INE. The rest of the gross value added is directly available in the MIOGA08. Data about household earnings by source of income from the Living Conditions Survey of Galicia 2008 is used to allocate primary income (wages and mixed rents) in different households.

4.3. Institutional account

In the institutional account, the way primary rents are distributed among the considered institutional agents is shown. Resources of this account are the regional primary income and the current transfers between institutional agents. In the third column final consumption, current transfers, direct taxes and, as a difference, the savings of the institutional agents appear.

As specified before, in order to allocate this primary income by columns, information from the Living Conditions Survey is used. In the case of the current transfers, both the Secondary Income Distribution of Households elaborated by IGE and the Government Budgets are the main sources used.

For the final consumption of households, we used the Household Budget Survey from the INE, which gives us information about annual expenditures of households by type of product. The database BADESPE is the main source in order to distribute the government final consumption, directly available from MIOGA08.

4.4. Other institutional accounts

The construction of the tax account is done using IO data from MIOGA08, the Government Budget of 2008 from IGE, and the database of the public sector (BADESPE) elaborated by Fiscal Studies Institute (IEF).

From the MIOGA08 the data of VAT, excise taxes and other production taxes classified by sectors can be obtained. All these indirect taxes are revenues for the governments, and they are distributed considering the share that appears in the Government Budget of 2008 and the Tax Accounts.

The data about the total direct taxes was taken from the Government Budget, and includes both household income and corporation taxes. The disaggregation between governments was done using information of the BADESPE database and the Tax Accounts from IGE. Data about total income gained from the Living Conditions Survey from IGE is used in order to distribute income tax among the different categories of households.

4.5. Saving-investment account

This account represents the macro balancing of savings and investments. Gross savings include those by household, enterprise, regional and the central government, and the foreign sector. These gross savings are equal to gross domestic capital formation.

The savings of the different categories of households are obtained by subtracting their consumption, transfers and direct taxes from their personal income. In the case of the enterprises, their retained earnings are treated as their savings. For the governments, the savings are the differences between their revenues from taxes and from transfers and their current expenditures. Finally, foreign savings are equal to the difference between gross domestic capital formation and gross domestic saving.

4.6. Foreign and tourism accounts

Finally, the last account shows the trade flows between residents and non-residents. Despite the fact that it is not considered as an institutional sector, the rest of the world has the same treatment as the others in the SAMs frameworks. Another issue to take into account is the fact that this foreign account is done from the point of view of the rest of the world. Resources for this account are expenditures in our economy and vice versa.

By rows, the foreign product purchases that our economy makes, i.e. imports, appear. By columns, we have sales that our economy makes to non-residents, i.e. exports. The resulting foreign savings is the difference between the two. Positive foreign savings means that our economy needs to borrow funds from the non-residents and vice versa, showing the sign of the trade balance between the two economies.

Another important characteristic of the SAMGAL-08 is the treatment of tourism as a separate account. Using information from the Spanish Tourism Satellite Account (STSA) and the Hotel Occupation Survey (HOS), we construct an inbound tourism consumption account (distinguishing between national inbound consumption and foreign inbound consumption). This consumption has different treatment in the IO framework than in the SAM framework. In the first, it appears included in the final household consumption, while in the second it should appear in the foreign account as another sale to the non-residents.

As explained for the trade accounts, the difference between inbound tourism consumption and outbound tourism consumption (available in the MIOGA08) reveals the sign of the tourism balance for the Galician economy.

5. Some results from the SAMGAL-08

In this section we are going to present the main results obtained in the design and elaboration of the SAMGAL-08. With a descriptive purpose, we aggregate the 29 sectors into six. Starting with the distribution of the primary generated income in Table 21, it can be seen that the majority of it goes to the gross operating surplus/gross mixed rents, with the exception of other services sectors, which mainly give revenues to the fourth type of wage earners (highly skilled).

Table 21 – Distribution of income generated among wage earners and self-employed/gross operating surplus

	Wages 1	Wages 2	Wages 3	Wages 4	GOS/GMR	Total
Primary sector	0.94%	7.74%	0.97%	1.60%	88.75%	100.00%
Manufacturing	7.03%	6.77%	3.69%	5.80%	76.70%	100.00%
Energy	4.51%	2.59%	2.91%	6.55%	83.44%	100.00%
Construction	15.40%	11.25%	2.34%	5.88%	65.13%	100.00%
Hospitality	10.52%	13.01%	7.01%	4.03%	65.42%	100.00%
Other Services	11.20%	11.46%	15.15%	44.17%	18.03%	100.00%
Regional Economy	**9.42%**	**9.34%**	**7.44%**	**18.76%**	**55.04%**	**100.00%**

Taking a look at the institutional agents included, we present the structure of the consumption of the households in Table 22. As shown, households have different pattern of consumption depending on their level of income, even at this level of aggregation.

Table 22 – Structure of the consumption of households

	HH1	HH2	HH3	HH4	HH5	HH6	HH7	HH8	Total
Primary sector	6.29%	5.14%	4.41%	3.68%	3.86%	4.03%	3.92%	3.92%	**4.21%**
Manufacturing	31.93%	35.30%	34.25%	33.14%	33.96%	37.05%	33.09%	29.12%	**33.28%**
Energy	10.68%	7.64%	7.02%	5.82%	5.73%	5.34%	5.93%	7.24%	**6.61%**
Construction	2.71%	1.95%	1.14%	1.07%	0.96%	1.61%	1.49%	0.88%	**1.36%**
Hospitality	8.20%	13.03%	19.16%	18.32%	20.22%	17.91%	19.34%	23.62%	**18.71%**
Other Services	40.20%	36.94%	34.03%	37.97%	35.28%	34.06%	36.23%	35.22%	**35.83%**
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	**100.00%**

Therefore, low-income Galician households spend a relatively higher percentage of their revenues on primary goods and on energy products while the high-income households have a relative higher percentage of expenditures on hospitality. Considering the structure of the total consumption, the main products are manufactured products (among them the food industry products and textiles), hospitality services (both accommodation and in particular food services), and other services.

Another interesting result that comes out with the SAMGAL-08 is the amount of social benefits paid and received in each type of household. This interaction between institutional agents is shown in Table 23. As expected, the net social benefits received depend on the level of income, even showing a negative sign in the richest households. Moreover, as can be drawn from the Secondary Income Distribution of households, this SAM reveals that Galicia is a net receptor of social benefits from the central government.

Table 23 – Social benefits paid and received among households (thousands of euros)

	Social Benefits paid	Social Benefits received	Net Social Benefits received
Household 1	85,098	1,645,668	1,560,570
Household 2	520,930	1,994,461	1,473,531
Household 3	484,147	1,432,513	948,366
Household 4	796,782	1,274,215	477,433
Household 5	1,501,483	1,619,206	117,723
Household 6	1,701,878	1,522,846	-179,032
Household 7	2,072,454	1,470,494	-601,960
Household 8	3,544,440	1,693,855	-1,850,585
Total	**10,707,212**	**12,653,258**	**1,946,046**

Finally, Table 24 shows the main revenues and expenditures of the regional and the central government considered in the SAMGAL-08. Starting with the revenues of the regional government, it can be seen that the current transfers from the central

government and the different taxes (except corporation tax) are the most important. Taking into account the correction of the IO data, 94.7% of the regional government budget of 2008 is distributed. In the case of the central government revenues, the transfers from households (mainly social security contributions) and those from the different taxes represent 99.3% of total revenues. In terms of the share of the different taxes, 25% of the direct taxes goes to the regional government, and in the case of indirect taxes (VAT, excise taxes and other taxes on production), their revenues represent 65% of the total.

On the expenditure side, following BADESPE data, 68.1% of the final consumption is made by the regional government (mostly on health and education services) while the 31.9% is made by the central one (essentially on public administration and defense). For current transfers, flows from the central government to households and to the regional government are the most significant.

In summary, the Galician regional government obtains almost 40% of the total revenues and expend 31% of total consumption. The rest corresponds to incomes and expenditures of the central government in Galicia.

Table 24 - Regional and central government revenues and expenditures (thousands of euros)

			Revenues
Regional Government (Regional and Local)	Revenues from taxes	Income Tax	1,334,654
		Corporation Tax	0
		VAT	1,453,124
		Excise Taxes	586,699
	Revenues from Current Transfers	From the Central Gov	5,452,764
		From firms	208
		From HH	175
		From ROE	5,565
	Revenues from Capital Transfers	From the Central Gov	362,775
		From firms	100
		From HH	1,106
		From ROE	485,592
	Total		9,682,762
	Corrections from IO data	Excise Taxes	1,693,530
		OTP	-14,565
	Total Corrected		**10,775,028**
	Regional Government Budget 2008		11,376,616
			94.71%

Source: Government Accounts of Galicia 2008 and MIOGA08, IGE.

			Revenues
Central Government (Central and SS)	Revenues from taxes	Income Tax	2,593,708
		Corporation Tax	1,323,945
		VAT	1,517,062
		Excise Taxes	49,707
	Revenues from Current Transfers	From the Regional Gov	6,953
		From firms	0
		From HH	10,705,931
		From ROE	0
	Revenues from Capital Transfers	From the Regional Gov	941
		From firms	0
		From HH	0
		From ROE	0
	Total		16,198,247
	Corrections from IO data	Excise Taxes	143,481
		OTP	-569
	Total Corrected		**16,291,452**

Source: Government Accounts of Galicia 2008, MIOGA08, BADESPE, Taxes Accounts and Secondary Income Distribution Account, INE and IGE.

			Expenses
Regional Government (Regional and Local)	Final Consumption	Public Administration	1,280,615
		Health and Chemicals	3,744,633
		Education	2,385,757
		Other Consumptions	1,101,534
	Current Transfers	To the Central Gov	6,953
		To firms	109,431
		To HH	569,644
		To ROE	6,907
	Capital Transfers	To the Central Gov	941
		To firms	395,441
		To HH	117,644
		To ROE	4,859
	Total		**9,724,359**
	Regional Government Budget 2008		11,480,390
			84.70%

Source: BADESPE and Government Accounts, IGE.

			Expenses
Central Government (Central and SS)	Final Consumption	Public Administration	2,793,962
		Health and Chemicals	0
		Education	197,003
		Other Consumptions	991,590
	Current Transfers	To the Regional Gov	5,452,764
		To firms	0
		To HH	11,965,970
		To ROE	0
	Capital Transfers	To the Regional Gov	362,775
		To firms	0
		To HH	0
		To ROE	0
	Total		**21,764,064**

Source: MIOGA08, Government Accounts and Secondary Income Distribution Account, IGE.

In the appendix, Table 25 shows the aggregated economic structure of Galicia in 2008.

6. Concluding remarks

For different regional analysis and models it is necessary to construct a comprehensive and consistent macroeconomic tool like a Social Accounting Matrix. Thus, many national and international researchers have put their efforts towards this, as the 13 national SAMs and the 9 regional SAMs in Spain can prove. Despite this fact, there was no SAM for the Galician region. For that reason, the main aim of this chapter is to present the first SAM for the Galician region based on the year 2008.

In the SAMGAL-08, we have focused mainly on the income distribution process, the regional fiscal policy issue, and on the foreign tourism account. For that, eight different households classified by income level, two governments, four types of taxes, and 29 sectors have been considered in the construction. As a database that integrates several sources, the Galician input-output framework, regional and national accounts, living conditions survey, wage structure survey, household budget survey, and government budgets among others have been used in the elaboration of the SAMGAL-08.

Our SAM indicates that 55% of the generated primary income goes to the gross operating surplus/gross mixed rents, with the exception of other services sectors, which mainly give revenues to highly skilled wage-earners. With regard to consumption

patterns by income level, we observe from the SAMGAL-08 that low-income households spend a relatively higher percentage of their revenues on products of the primary sector and on energy products, while high-income households have a relatively higher percentage of expenditures in hospitality, at the six-sector level of disaggregation.

Finally, results for governments reveal complementary behaviour between the regional and the central one. On the revenue side, different types of taxes are related with the regional government (34% of income taxes, almos 50% of the VAT, and 92% of the excise taxes), and others with the central government (66% of the income taxes, 50% of the VAT, corporation tax, and 8% of the excise taxes). On the expenditure side, the final consumption of the regional government is focused on health and education services while the central government is concentrated on public administration services.

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Appendix

Table 25 - General description of the SAMGAL-08 (Thousands of euros)

	Produc.	Wages	SSC	GOS/ GMR	HH	Enterp.	CG	RG	DT	VAT	ST	OPT	S-I Account	RO Spain	RO Europe	RO World	TC
Produc.	67,895,723	0	0	0	34,270,884	0	3,982,556	8,512,538	0	0	0	0	17,284,963	15,529,457	10,547,772	3,178,682	2,342,585
Wages	21,152,857	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSC	6,011,060	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GOS/GMR	25,892,480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HH	0	21,152,857	6,011,060	12,516,951	0	839,409	11,965,969	687,289	0	0	0	0	0	0	0	0	0
Enterp.	0	0	0	13,375,529	751,710	0	0	504,872	0	0	0	0	0	0	0	0	0
CG	0	0	0	0	10,705,931	0	0	7,894	3,917,653	1,517,062	143,481	-569	0	0	0	0	0
RG	0	0	0	0	1,281	308	5,815,539	0	1,334,654	1,453,124	1,693,530	-14,565	0	0	491,157	0	0
DT	0	0	0	0	3,928,362	1,323,945	0	0	0	0	0	0	0	0	0	0	0
VAT	2,970,186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ST	1,837,011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPT	-15,134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S-I Account	0	0	0	0	3,515,367	12,468,449	-5,472,612	1,050,669	0	0	0	0	0	1,782,120	94,670	4,412,521	-566,221
RO Spain	17,311,577	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RO Europe	11,121,833	0	0	0	0	0	0	11,766	0	0	0	0	0	0	0	0	0
RO World	7,591,203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TC	1,776,364	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 26 - SAMGAL-08 (Thousands of euros) (1st Part a)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14
S1	299,266	10	2,126,941	5,437	143,581	110,330	0	61,519	0	0	77	13	0	16,567
S2	366	14,640	1,357	0	0	1	2,112,883	60,836	213,821	262,275	458	0	537	656,928
S3	576,984	3	1,738,363	3,110	8	1	0	6,250	3	52	5	0	0	117
S4	21,709	374	7,864	1,218,160	1,481	6,845	2	20,808	1,855	3,695	429	224	124,177	2,761
S5	7,735	1,414	11,272	732	382,336	34,689	0	4,151	13,556	12,081	3,125	755	13,101	6,420
S6	281	1,483	213,248	18,242	44,063	98,311	85	43,825	19,550	26,103	6,627	2,937	16,527	4,508
S7	161,421	44,633	120,711	9,566	21,409	13,760	194,220	152,100	66,096	88,568	2,856	2,087	22,051	326,746
S8	145,959	4,771	205,519	127,904	122,945	73,296	68,146	680,409	108,415	185,588	84,150	30,232	582,588	68,246
S9	2,365	2,182	33,189	126	1,366	190	179	13,659	283,500	72,181	1,629	1,968	58,820	87,354
S10	38,131	0	208,792	5,089	15,383	7,792	4,484	66,727	28,218	1,978,411	200,431	341,711	2,132,101	150,555
S11	2,017	875	30,668	8,133	2,892	2,669	173	13,686	13,781	16,907	259,892	37,977	356,716	128,426
S12	29,985	27,618	58,055	13,479	34,989	15,787	14,414	29,124	53,558	128,494	14,442	72,066	250,790	86,630
S13	1,196	2,646	1,288	315	903	262	1,119	773	1,682	27,513	199	5,771	3,487,990	123
S14	49,047	12,609	112,155	15,810	34,696	22,889	7,851	78,687	84,472	570,509	23,969	9,035	138,544	964,095
S15	87,397	16,596	67,678	17,240	16,693	9,368	9,833	16,920	36,126	80,074	53,100	37,374	647,325	52,340
S16	6,244	6,726	35,058	14,656	3,214	1,491	13,907	8,194	18,318	18,496	9,533	243	63,898	164,105
S17	29,995	1,654	71,475	36,684	11,699	4,374	908	14,386	25,077	25,687	8,061	4,586	25,056	7,160
S18	60,514	40,479	256,516	54,396	76,471	26,098	29,597	68,342	161,008	235,295	22,219	10,867	150,594	85,012
S19	0	99	5,558	827	400	545	1,168	3,594	1,938	3,955	4,000	3,698	17,354	13,394
S20	0	328	1,393	457	0	276	2,178	3,035	384	3,075	179	232	6,576	5,451
S21	62,506	4,227	107,536	29,277	19,552	14,288	34,208	24,158	34,880	50,355	7,347	9,021	109,086	140,532
S22	925	785	27,017	10,990	2,410	1,533	62	2,579	2,907	6,422	6,069	1,035	5,066	13,901
S23	2,354	7,641	33,748	3,943	3,273	2,992	110	6,651	15,210	20,864	4,371	3,537	34,161	11,650
S24	95,979	11,209	378,503	88,828	25,328	30,465	69,417	112,337	69,438	126,150	40,858	38,279	288,672	145,410
S25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S26	4,455	45	3,179	1,558	423	307	228	1,361	578	5,539	1,195	1,185	15,114	15,222
S27	2,164	82	2,713	347	36	0	494	440	86	116	184	86	994	888
S28	4,917	1,661	35,175	9,167	3,428	18,993	19,387	10,709	5,993	11,944	2,324	1,790	29,329	93,491
S29	7,353	0	7,141	1,377	647	365	4,637	5,284	1,351	6,366	198	759	6,249	10,799

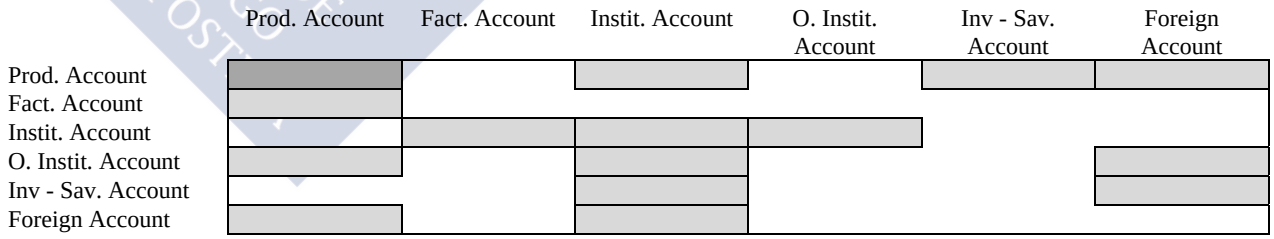


Table 27 - SAMGAL-08 (Thousands of euros) (1st Part b)

	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29
S1	2,643	0	230,195	6,007	14,409	202,223	0	0	0	7,926	11,334	625	9,617	5,228	0
S2	10	142,113	81,173	0	0	0	0	0	0	61	0	0	0	422	57
S3	0	0	81,910	0	64,145	1,619,536	0	0	0	3,028	980	4,636	87,620	27,223	196
S4	26,264	3,250	56,243	4,689	6,770	68,495	0	0	44	8,281	6,981	504	20,224	20,205	15,706
S5	77,831	220,668	27,181	2,449	183	18,908	0	0	463	10,019	3,117	1	283	12,501	16,803
S6	11,049	4,798	86,822	11,597	215	10,662	14,772	3,405	1,048	158,011	36,211	20,425	22,238	74,162	14,560
S7	12,412	76,537	183,451	660,251	8,568	88,855	8,779	7,437	14,430	39,776	24,630	12,943	40,302	8,794	7,494
S8	88,107	270,541	191,874	59,925	8,722	96,150	0	1,403	4,333	40,522	15,252	2,207	267,040	34,834	30,154
S9	13,800	1,602,963	40,311	311	3,372	33,725	0	0	134	1,294	1,977	4	7,771	11,479	1,130
S10	402,564	1,098,159	82,303	9,800	598	21,467	0	0	1,583	5,805	12,835	508	11,348	28,436	16,789
S11	81,385	172,253	130,673	36,595	3,881	22,374	3,109	6,359	7,077	56,313	27,266	2,559	57,612	115,829	44,952
S12	46,975	105,018	120,369	9,342	670	30,754	0	2,439	2,218	14,070	2,700	0	13,906	33,022	7,994
S13	20,711	0	91,476	33,461	0	812	0	2,087	9,794	801	16,377	288	1,049	1,123	109
S14	150,509	65,334	322,655	58,155	26,260	85,799	27,813	12,595	6,811	68,916	80,160	36,422	49,323	69,166	36,446
S15	191,609	177,782	125,518	125,294	16,495	120,780	111	27,020	4,186	99,176	34,204	31,885	278,801	174,495	32,852
S16	34,765	6,719,987	149,571	71,197	5,820	31,948	25,928	613,870	14,794	31,441	69,819	26,501	42,045	27,579	7,651
S17	13,595	95,362	88,778	37,313	2,653	81,739	546	4,217	3,424	12,635	8,762	802	97,809	12,037	6,710
S18	34,962	149,256	766,498	973,597	2,564	19,918	26,039	1,073	10,457	48,272	123,546	11,475	24,577	35,836	89,292
S19	5,388	13,963	30,509	3,159	2,173	888	15,752	180	2,119	26,505	11,578	1,658	1,777	10,370	130,752
S20	2,786	5,400	19,958	15,835	990	1,499	7,216	382	2,056	12,404	12,565	22,962	23,984	21,911	11,878
S21	24,887	383,937	298,802	140,378	11,248	134,851	752,773	234,948	20,268	91,135	52,427	20,984	40,008	55,600	29,282
S22	8,224	50,070	511,800	55,003	35,747	171,443	73,799	22,981	21,656	110,029	61,853	31,862	66,467	85,757	18,432
S23	13,241	137,237	27,239	47,824	2,694	9,372	0	272	37,573	30,646	4,988	1,712	17,293	45,260	8,193
S24	93,367	483,379	743,811	132,736	21,433	99,561	255,720	83,586	18,294	658,089	316,575	69,426	199,648	397,270	94,810
S25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S26	1,320	12,563	29,936	2,913	924	3,941	1,661	1,141	49	10,234	19,161	12,262	9,174	11,357	996
S27	333	10,037	22,298	2,058	3,702	10,462	1,677	0	0	5,014	1,135	527	164,627	6,885	159
S28	7,129	85,473	116,565	35,843	10,823	77,113	67,403	5,343	3,367	224,433	137,861	31,929	52,373	755,134	65,132
S29	2,585	18,425	28,652	17,964	11,560	11,830	4,059	2,166	9,939	44,599	28,770	6,195	41,572	17,986	75,927

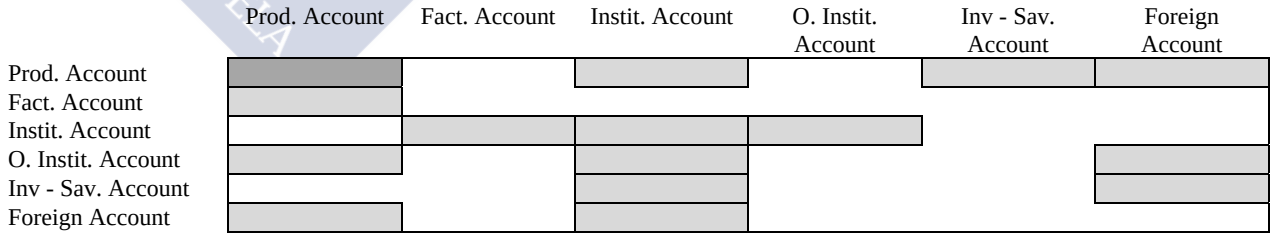


Table 28 - SAMGAL-08 (Thousands of euros) (2nd Part a)

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14
LAB1	32,236	59,281	226,423	91,948	67,991	15,963	10,704	27,424	104,980	155,388	14,140	19,405	190,176	31,152
LAB2	266,019	25,571	179,942	108,528	55,336	14,272	4,419	48,779	77,293	173,259	21,551	33,072	83,141	28,191
LAB3	33,426	14,014	84,720	61,416	20,987	26,480	0	34,940	30,151	78,417	18,898	23,039	93,749	51,348
LAB4	54,901	14,933	159,616	36,548	40,913	51,497	21,078	75,702	56,947	111,776	32,194	53,496	173,462	110,831
SSC	75,054	38,520	196,870	95,609	53,442	34,323	11,097	64,743	87,448	190,290	26,519	38,602	205,073	72,259
CAP	3,048,854	209,605	2,425,743	1,499,899	281,097	264,161	495,097	1,673,777	566,946	868,091	937,278	541,362	1,087,517	1,167,141
HOH 1														
HOH 2														
HOH 3														
HOH 4														
HOH 5														
HOH 6														
HOH 7														
HOH 8														
CRP														
GOVC														
GOVR														
DT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NIT	66,547	514	346,242	241,786	5,413	27,771	201,543	127,061	10,339	25,185	114,107	23,327	137,786	111,504
ET	-84,256	36,099	446,183	9,113	1,454	106	737,902	4,654	570	3,857	10,256	3,518	58,937	95,345
OTP	-211,681	239	-32,092	-2,530	-1,303	-419	3,250	1,525	-1,088	4,882	3,810	454	-1,243	21,737
INV														
EXTRS	551,926	31,373	2,535,758	997,883	59,598	415,224	884,616	1,723,838	745,752	3,086,451	426,150	345,468	550,223	0
EXTRE	326,398	133,741	381,138	443,707	152,587	157,836	279,209	1,079,061	105,086	1,332,117	1,106,183	920,351	3,437,599	0
EXTROW	225,056	2,823,987	703,764	712,893	113,713	8,293	351,362	386,286	44,628	301,740	802,377	275,199	332,998	0
TCN	66,381	0	91,644	4,211	1,546	13,172	47,310	914	1,823	6,584	0	0	4,373	31,627
TCF	7,630	0	10,534	484	178	1,514	5,438	105	209	757	0	0	503	3,635
Total	6,159,756	3,592,667	13,658,597	5,997,345	1,822,578	1,528,110	5,642,715	6,759,353	3,092,885	10,305,509	4,271,390	2,894,761	14,937,710	4,983,601

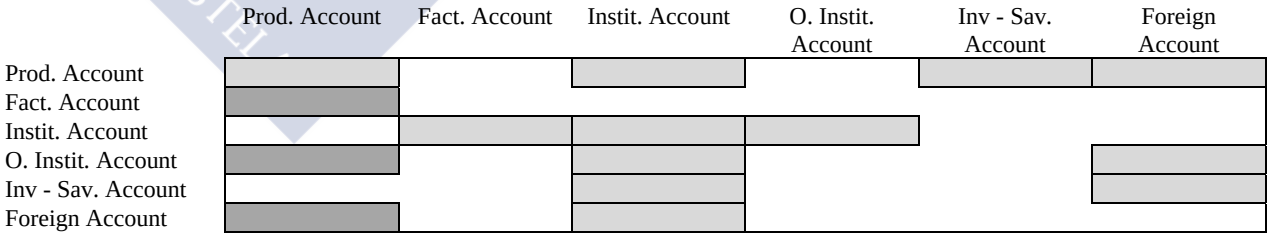


Table 29 - SAMGAL-08 (Thousands of euros) (2nd Part b)

	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29
LAB1	132,920	1,112,122	496,769	264,387	47,044	259,896	66,743	15,761	14,890	361,065	66,691	64,493	166,876	155,419	157,517
LAB2	212,076	812,132	649,983	283,106	58,156	321,284	78,031	14,860	14,040	244,599	181,423	77,246	117,829	105,287	106,708
LAB3	76,981	168,940	578,251	164,852	31,348	173,181	328,417	13,104	12,380	353,961	292,254	105,878	321,168	152,361	154,418
LAB4	71,504	424,538	860,260	187,317	18,034	99,629	437,051	38,267	36,153	616,712	1,236,843	1,783,506	1,489,625	265,462	269,046
SSC	153,235	681,117	715,779	254,216	46,516	227,633	283,835	20,953	23,834	454,143	475,266	622,672	577,428	185,025	99,559
CAP	1,267,315	4,703,197	-6,654,532	546,400	162,507	1,745,668	996,995	3,778,888	121,548	889,365	698,952	175,087	-455,616	1,514,592	1,335,546
HOH 1															
HOH 2															
HOH 3															
HOH 4															
HOH 5															
HOH 6															
HOH 7															
HOH 8															
CRP															
GOVC															
GOVR															
DT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NIT	120,220	458,999	87,667	61,965	31,218	242,305	2,124	40,453	16,600	197,555	0	4,189	0	193,721	74,045
ET	-7,936	73,757	299	-101,055	0	0	100,484	12	293	406,809	0	0	0	48,986	-8,376
OTP	547	53,400	-16,982	-18,082	1,326	-7,601	12,427	327,084	960	-26,717	84	1,152	725	-127,104	-1,894
INV															
EXTRS	636,788	0	150,068	785,714	271,862	1,923	608,160	4,740	159,785	1,818,714	0	0	0	378,091	141,472
EXTRE	428,795	0	52,716	223,491	0	0	210,460	410	47,000	181,869	0	0	0	122,079	0
EXTROW	180,520	0	21,875	93,676	0	0	48,987	940	22,900	88,550	0	0	0	51,459	0
TCN	5,505	0	17,371	339,845	303,579	405,482	1,589	69,983	19,841	0	0	0	0	38,124	79,693
TCF	633	0	1,997	29,199	26,586	60,734	256	42,551	1,331	0	0	0	0	6,519	24,974
Total	4,647,554	20,592,707	1,648,092	5,668,727	1,264,795	6,605,239	4,462,716	5,400,910	687,672	7,406,060	4,074,577	3,185,525	3,866,523	5,189,922	3,197,164

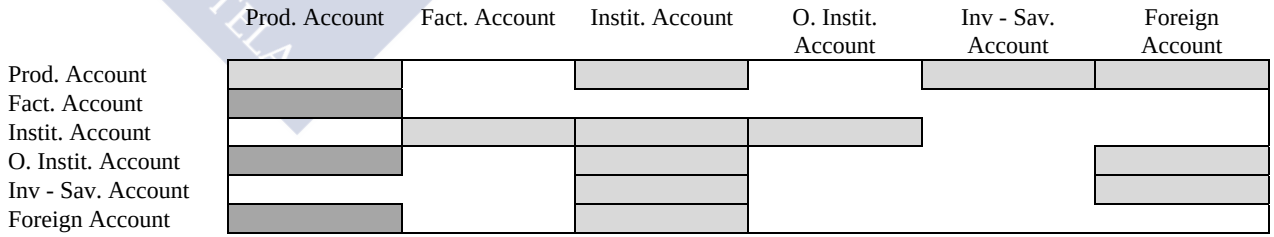


Table 30 - SAMGAL-08 (Thousands of euros) (3rd Part)

	LAB1	LAB2	LAB3	LAB4	SSC	CAP	HOH 1	HOH 2	HOH 3	HOH 4	HOH 5	HOH 6	HOH 7	HOH 8	CRP	GOVC	GOVR	DT	NIT	ET	OTP	INV	EXTRS	EXTRE	EXTROW	TCN	TCF	Total
S1							137,449	165,714	116,913	112,444	197,614	224,825	212,291	275,799	0	0	0					130,736	923,154	322,380	3,249	63,912	19,328	6,159,756
S2							141	253	411	606	702	1,201	580	509	0	0	0					-67,967	33,110	36,035	39,148	0	0	3,592,667
S3							382,188	558,973	390,811	424,974	763,104	968,278	727,802	797,227	0	0	0					92,181	3,148,123	956,687	119,160	88,235	26,684	13,658,597
S4							105,912	183,810	141,900	185,782	309,999	351,589	335,793	464,989	0	0	0					7,459	1,232,499	789,426	234,867	4,054	1,226	5,997,345
S5							1,737	2,697	1,613	2,758	12,304	6,580	2,781	5,169	0	0	0					12,167	558,279	265,289	67,492	1,488	450	1,822,578
S6							6,739	7,196	10,169	16,702	27,984	24,174	30,464	38,341	0	0	0					18,770	61,577	296,736	6,976	12,682	3,835	1,528,110
S7							161,924	156,117	124,224	105,910	181,427	195,581	222,598	392,304	0	0	0					-6,990	1,080,801	226,302	322,309	45,550	13,775	5,642,715
S8							56,774	98,544	78,038	84,104	172,490	148,173	171,727	173,744	0	0	966,074					1,062	680,651	436,658	90,936	880	266	6,759,353
S9							2,407	4,336	7,044	10,379	12,026	20,583	9,930	8,715	0	0	0					26,139	375,135	292,219	44,707	1,755	531	3,092,885
S10							17,355	9,846	4,219	41,308	21,969	23,104	15,393	31,296	0	0	0					75,834	2,021,407	877,601	287,901	6,339	1,917	10,305,509
S11							39,334	70,105	43,830	57,417	97,191	134,564	105,127	144,167	0	0	0					1,001,897	537,281	113,158	284,270	0	0	4,271,390
S12							4,635	5,915	2,513	4,611	8,040	9,159	9,195	9,245	0	0	0					1,059,867	227,391	192,722	142,560	0	0	2,894,761
S13							14,326	66,943	116,626	92,769	127,021	212,840	175,127	202,395	0	0	4,375					1,086,349	2,445,173	5,330,295	1,348,120	4,210	1,273	14,937,710
S14							71,153	90,027	61,341	71,525	111,735	101,207	98,006	117,173	0	0	0					0	990,671	5,876	4,496	30,450	9,209	4,983,601
S15							66,036	129,515	110,996	92,328	187,866	167,116	207,875	174,974	0	166,054	70,446					384,361	203,676	66,794	24,342	5,300	1,603	4,647,554
S16							59,127	62,938	30,278	32,755	49,108	89,915	80,660	62,173	0	0	0					11,888,754	0	0	0	0	0	20,592,707
S17							35,571	90,042	32,411	49,832	122,455	133,712	101,346	173,393	0	0	0					0	142,890	10,621	852	16,725	5,058	1,648,092
S18							42,957	76,211	57,097	77,821	108,016	109,248	126,210	164,865	0	0	133,308					0	501,118	237,840	95,733	244,581	98,952	5,668,727
S19							3,198	6,008	46,286	17,937	57,189	112,622	129,042	268,122	0	0	0					0	0	0	0	222,697	88,393	1,264,795
S20							175,833	413,908	461,498	542,059	978,665	886,043	917,871	1,394,729	0	0	22,449					0	0	0	0	508,731	118,063	6,605,239
S21							77,612	134,478	116,237	141,032	228,800	234,382	241,125	300,671	0	0	0					0	26,788	16,545	3,940	2,142	463	4,462,716
S22							432,362	449,790	313,133	346,382	516,923	504,903	462,278	565,292	0	0	5,314					20,911	0	0	0	356,421	20,377	5,400,910
S23							6,351	11,267	8,441	11,505	15,969	16,151	18,659	24,373	0	0	0					0	18,780	5,198	0	11,152	5,777	687,672
S24							36,071	14,514	10,532	39,888	19,330	26,839	25,336	120,293	0	55,192	128,897					1,481,141	173,752	40,660	45,037	0	0	7,406,060
S25							0	0	0	0	0	0	0	0	0	2,793,962	1,280,615					0	0	0	0	0	0	4,074,577
S26							10,497	12,356	19,787	34,619	82,649	91,258	66,299	117,279	0	197,003	2,385,757					0	0	0	0	0	0	3,185,525
S27							63,608	82,977	86,250	73,115	177,053	119,935	136,767	134,312	0	0	2,754,962					0	0	0	0	0	0	3,866,523
S28							58,498	175,218	153,967	256,884	328,986	433,304	498,147	478,668	0	354,489	211,861					72,292	136,357	28,730	12,587	54,605	11,100	5,189,922
S29							114,485	144,073	104,161	129,530	207,548	229,726	285,130	400,180	0	415,856	548,480					0	10,844	0	0	209,192	23,204	3,197,164

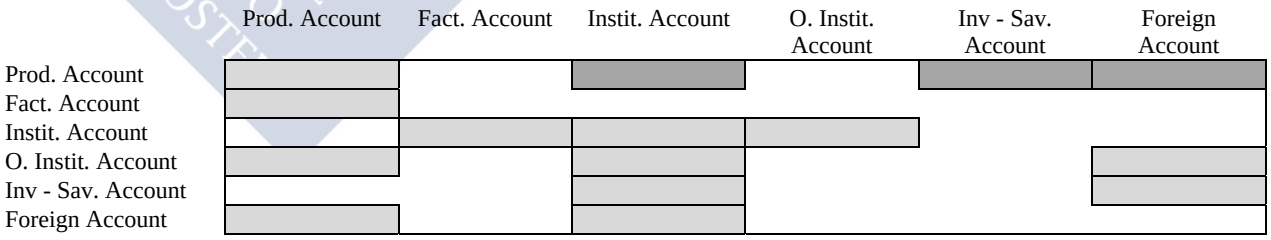


Table 31 - SAMGAL-08 (Thousands of euros) (4th Part)

	LAB1	LAB2	LAB3	LAB4	SSC	CAP	HOH 1	HOH 2	HOH 3	HOH 4	HOH 5	HOH 6	HOH 7	HOH 8	CRP	GOVC	GOVR
LAB1																	
LAB2																	
LAB3																	
LAB4																	
SSC																	
CAP																	
HOH 1	76,819	25,166	22,973	14,444	39,615	179,438	0	0	0	0	0	0	0	0	48,673	1,556,280	89,388
HOH 2	512,705	167,965	153,325	96,403	264,393	883,918	0	0	0	0	0	0	0	0	77,145	1,886,128	108,333
HOH 3	323,211	240,021	193,300	180,197	266,193	620,941	0	0	0	0	0	0	0	0	93,224	1,354,703	77,810
HOH 4	536,798	398,635	321,039	299,276	442,101	982,562	0	0	0	0	0	0	0	0	92,269	1,205,003	69,212
HOH 5	682,163	831,679	521,947	1,012,484	866,235	1,526,962	0	0	0	0	0	0	0	0	116,140	1,531,255	87,951
HOH 6	791,981	965,568	605,974	1,175,481	1,005,688	1,497,146	0	0	0	0	0	0	0	0	139,703	1,440,129	82,717
HOH 7	562,550	660,026	627,688	2,259,557	1,167,898	2,379,469	0	0	0	0	0	0	0	0	143,092	1,390,621	79,873
HOH 8	943,577	1,107,073	1,052,833	3,789,999	1,958,937	4,446,515	0	0	0	0	0	0	0	0	129,163	1,601,850	92,005
CRP	0	0	0	0	0	13,375,529	43,588	69,085	83,484	82,629	104,006	125,107	128,143	115,668	0	0	504,872
GOVC	0	0	0	0	0	0	85,088	520,868	484,089	796,687	1,501,303	1,701,674	2,072,206	3,544,016	0	0	7,894
GOVR	0	0	0	0	0	0	10	62	58	95	180	204	248	424	308	5,815,539	0
DT							0	152,268	130,728	281,503	507,402	558,518	836,378	1,461,565	1,323,945	0	0
NIT							0	0	0	0	0	0	0	0	0	0	0
ET							0	0	0	0	0	0	0	0	0	0	0
OTP							0	0	0	0	0	0	0	0	0	0	0
INV							-260,170	184,261	515	129,005	-60,238	-258,128	820,240	2,959,882	12,468,449	-5,472,612	1,050,669
EXTRS							0	0	0	0	0	0	0	0	0	0	0
EXTRE							0	0	0	0	0	0	0	0	0	0	11,766
EXTROW							0	0	0	0	0	0	0	0	0	0	0
TCN							0	0	0	0	0	0	0	0	0	0	0
TCF							0	0	0	0	0	0	0	0	0	0	0
Total	4,429,804	4,396,133	3,499,079	8,827,841	6,011,060	25,892,480	2,052,796	4,150,315	3,349,600	4,346,895	7,176,816	7,704,387	9,270,774	15,121,952	14,632,111	16,291,452	10,775,028

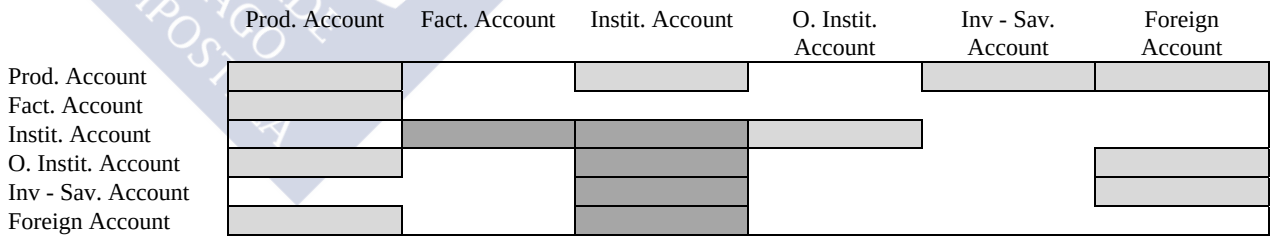
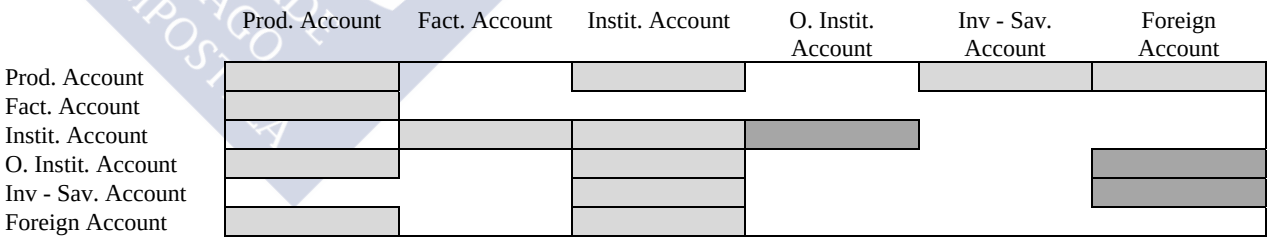
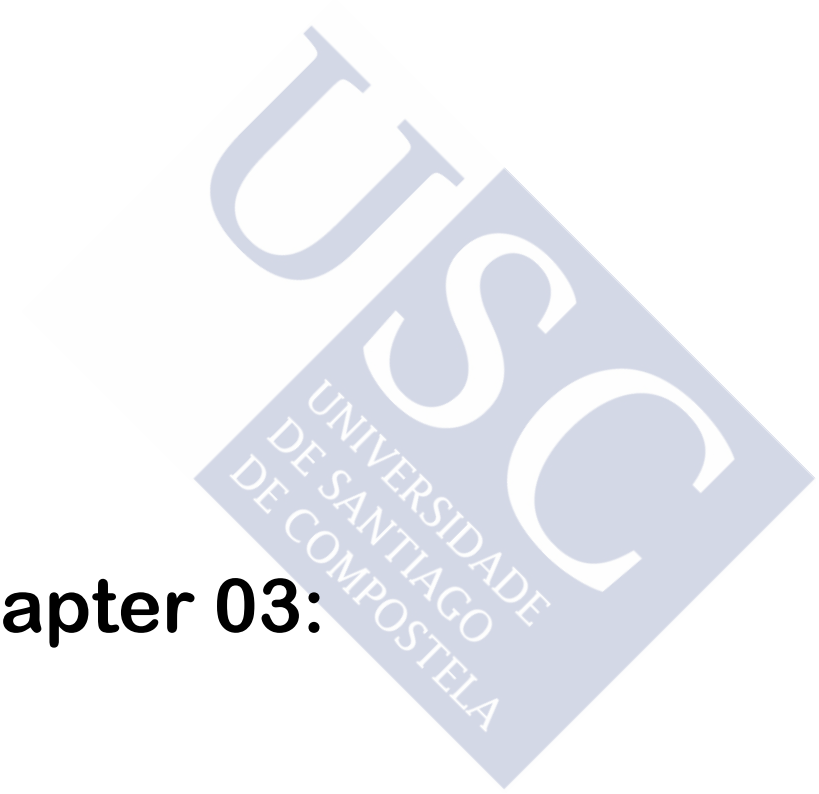


Table 32 - SAMGAL-08 (Thousands of euros) (5th Part)

	DT	NIT	ET	OTP	INV	EXTRS	EXTRE	EXTROW	TCN	TCF	Total
LAB1											4,429,804
LAB2											4,396,133
LAB3											3,499,079
LAB4											8,827,841
SSC											6,011,060
CAP											25,892,480
HOH 1	0	0	0	0		0	0	0	0	0	2,052,796
HOH 2	0	0	0	0		0	0	0	0	0	4,150,315
HOH 3	0	0	0	0		0	0	0	0	0	3,349,600
HOH 4	0	0	0	0		0	0	0	0	0	4,346,895
HOH 5	0	0	0	0		0	0	0	0	0	7,176,816
HOH 6	0	0	0	0		0	0	0	0	0	7,704,387
HOH 7	0	0	0	0		0	0	0	0	0	9,270,774
HOH 8	0	0	0	0		0	0	0	0	0	15,121,952
CRP	0	0	0	0		0	0	0	0	0	14,632,111
GOVC	3,917,653	1,517,062	143,481	-569		0	0	0	0	0	16,291,452
GOVR	1,334,654	1,453,124	1,693,530	-14,565		0	491,157	0	0	0	10,775,028
DT											5,252,307
NIT											2,970,186
ET											1,837,011
OTP											-15,134
INV						1,782,120	94,670	4,412,521	-340,504	-225,717	17,284,963
EXTRS											17,311,577
EXTRE											11,133,599
EXTROW											7,591,203
TCN											1,550,597
TCF											225,767
Total	5,252,307	2,970,186	1,837,011	-15,134	17,284,963	17,311,577	11,133,599	7,591,203	1,550,597	225,767	





Chapter 03:

Income distribution and inbound tourism consumption in Galicia: multiplier decomposition analysis

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1. Introduction

As explained in Blake (2008, p. 512), if the poor are not involved in tourism (actively or passively), tourism activities will help to make social inequalities deeper and enlarge the gap between those with access to capital and those who are on the threshold of subsistence (suggested by Cleverdon and Kalisch, 2000).

We can identify different forces in one way or another that suggests tourism might not be redistributive for the households on an economy. Therefore, the ways in which tourism consumption affects income distribution involves three channels (Blake *et al.*, 2008): changes in prices, earnings of households, and government revenues.

- Tourism consumption could be negative for income redistribution since the increase of prices is transmitted mainly to food and beverages, real estate services, and primary products, which are basic products for the poorest households, but also to accommodation services and cultural and recreational services mainly consumed by wealthier households.

- Tourism consumption is redistributive since it mainly tends to employ lower-skilled wage earners that usually belong to poorer households[12]. However, depending on the degree of tourism specialisation of the region, the amount of self-employment in accommodation and restaurant services can be relatively high.

- Tourism consumption could be redistributive since it means more revenues for governments. It will depend on the tax rate of tourism products and on the expenditures made with these new revenues by the government.

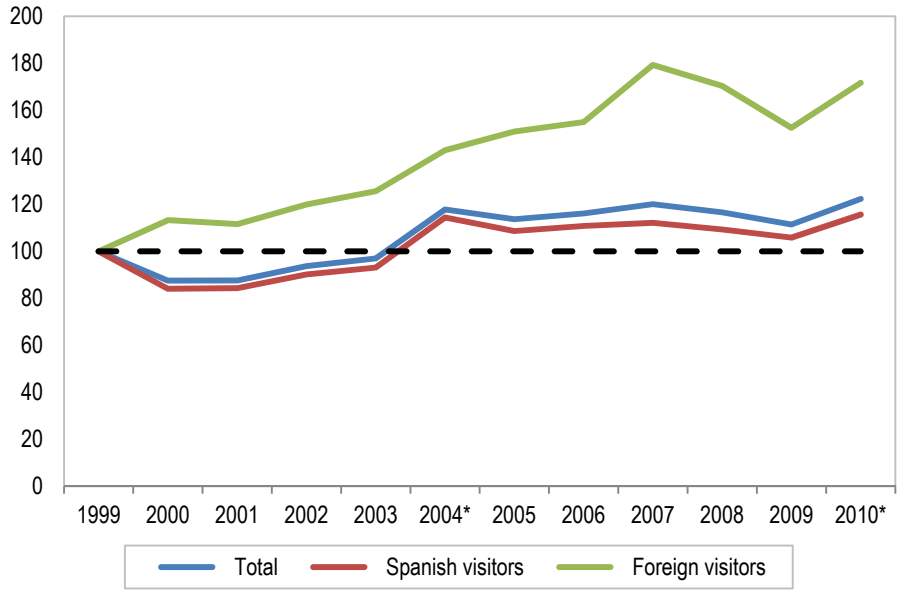
In this chapter, we focus our analysis on the last two channels through a regional social accounting matrix (SAM) model of Galicia for the year 2008. This SAM, which is elaborated with a special design for tourism policy evaluation, allows us to examine not only production impacts but also the effects on the generated income in the labor market (four different types of wage earners classified by education, and self-employed workers) and the disposable income of the households, among other institutional sectors.

[12] Moreover, as explained by Fernández *et al.* (2009), when a region is highly specialised in hospitality, workers in that sector have a small probability of receiving low wages.

Therefore, the aim of this chapter is to assess the economic significance of both foreign inbound tourism consumption and national inbound tourism consumption for 2008. Moreover, with the purpose of going more in depth on the distributive effects, the traditional multiplicative and additive SAM multiplier decomposition are presented.

In recent years, the evolution of tourism consumption in Galicia has experienced significant changes. From 1999 to 2010, the foreign inbound tourism overnight stays have grown more than 70% (from 0.8 to 1.4 million overnight stays) while the national inbound tourism has grown just 15% (from 5.8 to 6.8 million overnight stays) despite being the main touristic profile for Galicia, as can be seen in Figure 13.

Figure 13 – Evolution of Galician overnight stays (1999-2010) (Year 1999=100)



Source: Own elaboration from data of the Spanish Hotel Occupation Survey.
* Holy year or "Año Xacobeo".

Moreover, if we take a look at the expenditures made by these two profiles in Table 33, we can see that they have slightly different consumption patterns. Following the Spanish Tourism Satellite Account (TSA), foreign inbound tourists spend a relatively higher part of their budget on hotels and similars, transport by plane, transport rental services, and on other transport services. In the case of the national inbound tourism consumption, they spend more on real estate services, transport by train, bus, or car, and on travel agency services.

After combining the two aspects we have described, a deeper analysis of the economic significance and distributional effects of these two tourism consumption profiles seems to be needed. The amount of income generated by tourism consumption depends directly on the kind of products they acquire on their visits, affecting the economic contribution to a region.

Table 33 - Consumption patterns of the two profiles considered for 2008

	Foreign Inbound Tourism Consumption	National Inbound Tourism Consumption
Accommodation services	24,1%	30,6%
· Hotels and similar	*19,6%*	*11,8%*
· Real estate rental services	*4,5%*	*18,8%*
Restaurant services and similar	26,2%	26,9%
Transport of passengers	13,7%	12,3%
· By train	*0,5%*	*1,5%*
· By bus or car	*0,9%*	*2,1%*
· By ship	*0,4%*	*0,7%*
· By plane	*11,9%*	*8,0%*
Transport rental services	1,3%	0,6%
Travel agency services	0,8%	6,3%
Other transport services	8,2%	0,6%
Sport and cultural services	2,5%	2,9%
Total characteristic products	**76,7%**	**80,2%**
Goods	18,9%	14,9%
Other non-characteristic services	4,4%	4,9%
Total non-characteristic products	**23,3%**	**19,8%**
Total (purchase prices)	**100,0%**	**100,0%**

Source: Own elaboration from data of the Spanish Tourism Satellite Account (2008).

The rest of the chapter is divided into four additional sections. In the first we analyse the work related to tourism impact particularly that which is focused on distributional effects and on poverty relief. In the second section our objective is to describe the specification of the SAM model that is going to be used in the simulations. We also explain the SAM decompositions and the main features of the Galician SAM for the year 2008. After that, we present the main results obtained in terms of economic contribution and distributional effects. Finally, the last section explains the main conclusions that have been reached through this chapter.

2. Related literature

Traditionally, tourism studies conducted with economy-wide models have been concentrated on assessing the impact of tourism shocks through Input-Output multipliers analysis (Archer, 1982, 1995; Fletcher, 1989, 1994; Archer and Fletcher, 1996; Frechtling and Horvath, 1999; Kweka *et al.*, 2003; Polo and Valle, 2008) or Computable General Equilibrium (CGE) models (Zhou *et al.*, 1997; Dwyer *et al.*, 2006; Blake *et al.*, 2008), as well as studying its total contribution to the economy. However, there is much less literature focused on measuring the distributional effects of tourism. Wattanakuljarus and Coxhead (2008) presented some simulations for Thailand with a CGE model revealing that, although tourism growth benefits all classes of households, the greatest gains are received by high-income and non-agricultural households. Therefore in this paper, results show that inbound tourism expansion is not pro-poor as it is often assumed.

Another study that implements a CGE model in order to calculate the effects of tourism on poverty relief and income redistribution in Brazil is Blake *et al.* (2008). The results show that low-income households (but not the lowest) are the main beneficiaries from the earnings and price channels, and at the same time high and medium-income households benefit most from government channel effects of a tourism expansion.

Finally, Blake (2008) conducts an analysis about the relationships between tourism industries and the rest of the economy with a set of SAMs for three countries of the East Africa sub-region (Kenya, Tanzania and Uganda). This paper is also focused on the income distribution since these SAMs distinguish between different households (20 for Kenya, 12 for Tanzania and 10 for Uganda) and has some labor market detail. Results of this paper demonstrate that the hotels and restaurants industry has high backwards linkages with the rest of the economy, but also provides below-average shares of income to poor households.

3. Model specification

3.1. General specification of the SAM model

In this chapter, a SAM multiplier model is applied. This macroeconomic simulation model consists of two parts: production and consumption Leontief functions and different accounting identities. Taking into account that a SAM is an extension of the

Input-Output (IO) accounting framework, in the first step, the IO model is defined as (Leontief, 1941):

$$\boldsymbol{x} = (\boldsymbol{I} - \boldsymbol{A})^{-1}\boldsymbol{f} \qquad (17)$$

Consequently, by knowing the final demand for a particular moment in time ($\boldsymbol{f}$) we are able to obtain the value of required output for each industry to satisfy it ($\boldsymbol{x}$). In other words, it can be used to examine how production changes in response to a change in final demand.

Similarly, in the case of the "fully articulated" SAM model the transaction matrix is defined (Miller and Blair, 2009) as:

$$\overline{\boldsymbol{G}} = \begin{pmatrix} \overline{\boldsymbol{Z}} & \boldsymbol{F} \\ \boldsymbol{W} & \boldsymbol{B} \end{pmatrix} \qquad (18)$$

Where the different economic relations are divided in an endogenous part. $\overline{\boldsymbol{Z}}$, and an exogenous one. $\boldsymbol{F}$ symbolises the exogenous final consumption matrix, $\boldsymbol{W}$ the exogenous generated income, and $\boldsymbol{B}$ the exogenous income distributional matrix. Therefore, in order to construct a SAM multiplier model it is necessary to distinguish between intermediate flows, final demand transactions, and value added categories:

$$\overline{\boldsymbol{Z}} = \begin{pmatrix} \boldsymbol{Z} & \boldsymbol{0} & \overline{\boldsymbol{C}} \\ \overline{\boldsymbol{V}} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \overline{\boldsymbol{Y}} & \overline{\boldsymbol{H}} \end{pmatrix} \qquad (19)$$

$\overline{\boldsymbol{C}}$ stands for the final demand matrix (of those transactions specified as endogenous) , $\overline{\boldsymbol{V}}$ represents the matrix of primary inputs or value added, $\overline{\boldsymbol{Y}}$ is the matrix that distributes income to value added categories and, finally, $\overline{\boldsymbol{H}}$ is the matrix that distributes the income from institutional sectors to final demand groups.

At this point, the SAM multipliers can be defined as $\boldsymbol{S} = \boldsymbol{Z}\widehat{\boldsymbol{x}}^{-1}$:

$$\boldsymbol{S} = \begin{pmatrix} \boldsymbol{A} & \boldsymbol{0} & \boldsymbol{C} \\ \boldsymbol{V} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{Y} & \boldsymbol{H} \end{pmatrix} \qquad (20)$$

Corresponding to $\overline{\boldsymbol{Z}}$, $\boldsymbol{A}$ is the matrix of interindustry technical coefficients, $\boldsymbol{C}$ is that of final expenditure coefficients, $\boldsymbol{V}$ is the matrix of value added coefficients, $\boldsymbol{Y}$ is that of

coefficients distributing income to value added sectors, and $\boldsymbol{H}$ is the matrix of coefficients distributing income from the institutional sectors to final demand groups.

Therefore, the basic SAM model is defined as $\bar{\boldsymbol{x}} = \boldsymbol{S}\bar{\boldsymbol{x}} + \bar{\boldsymbol{f}}$ or, to emphasize the parallelism with the IO model discussed above:

$$\bar{\boldsymbol{x}} = (\boldsymbol{I} - \boldsymbol{S})^{-1}\bar{\boldsymbol{f}} \qquad (21)$$

Where $\bar{\boldsymbol{x}} = \begin{pmatrix} \boldsymbol{x} \\ \boldsymbol{v} \\ \boldsymbol{y} \end{pmatrix}$ is a vector made up of three different subvectors: $\boldsymbol{x}$ is the vector of total output by activities, $\boldsymbol{v}$ is the vector of total value added and $\boldsymbol{y}$ is the vector of the total income of the institutional sectors. In the same way, $\bar{\boldsymbol{f}} = \begin{pmatrix} \boldsymbol{f} \\ \boldsymbol{w} \\ \boldsymbol{h} \end{pmatrix}$ is made up of another three subvectors: $\boldsymbol{f}$ is the vector of exogenous demand, $\boldsymbol{w}$ is the vector of exogenous value added, and $\boldsymbol{h}$ is the vector of exogenous income of the households.

Thus, with the SAM model, the effect of exogenous changes ($\bar{\boldsymbol{f}}$) on the economy in terms of total output, value added and income of the institutional sectors ($\bar{\boldsymbol{x}}$) can be simulated.

3.2. SAM multipliers decomposition

In order to decompose the SAM multipliers (Pyatt and Round, 1979 and 1985 and Thorbecke, 1998), we can start disaggregating the S matrix into two additive matrices (Miller and Blair, 2009):

$$\boldsymbol{S} = \boldsymbol{Q} + \boldsymbol{R};\ \ \boldsymbol{Q} = \begin{pmatrix} \boldsymbol{A} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{H} \end{pmatrix};\ \ \boldsymbol{R} = \begin{pmatrix} \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{C} \\ \boldsymbol{V} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{0} & \boldsymbol{Y} & \boldsymbol{0} \end{pmatrix} \qquad (22)$$

And then, defining $\boldsymbol{T}$ as:

$$\boldsymbol{T} = (\boldsymbol{I} - \boldsymbol{Q})^{-1}\boldsymbol{R} \qquad (23)$$

We are able to decompose the $\boldsymbol{M}$ matrix into three:

$$\boldsymbol{M = M_3 M_2 M_1 = (I - S)^{-1}} \quad (24)$$

$$\boldsymbol{M_1 = (I - Q)^{-1}} \quad (25)$$

$$\boldsymbol{M_2 = (I + T + T^2)} \quad (26)$$

$$\boldsymbol{M_3 = (I - T^3)^{-1}} \quad (27)$$

Where $\boldsymbol{M1}$ is the matrix of direct multipliers (also called as "intragroup" or "own" multipliers), the $\boldsymbol{M2}$ stands for the matrix of indirect multipliers ("extragroup" or "open loop" multipliers), and $\boldsymbol{M3}$ is defined as the matrix of feedback multipliers ("cross" or "closed loop").

As Miller and Blair (2009) explain, in many kinds of analyses involving SAM multipliers, it is more convenient to formulate them in an additive portioning, Figure 14. These "additive" multipliers were first proposed by Stone (1985) and further developed by Pyatt and Round (1985) as:

$$\boldsymbol{M = (I - S)^{-1} = N_1 + N_2 + N_3 = M_3 M_2 M_1} \quad (28)$$

Where $\boldsymbol{N1}$ is defined as the matrix of direct multipliers (or "own" multipliers):

$$\boldsymbol{N_1 = M_1} \quad (29)$$

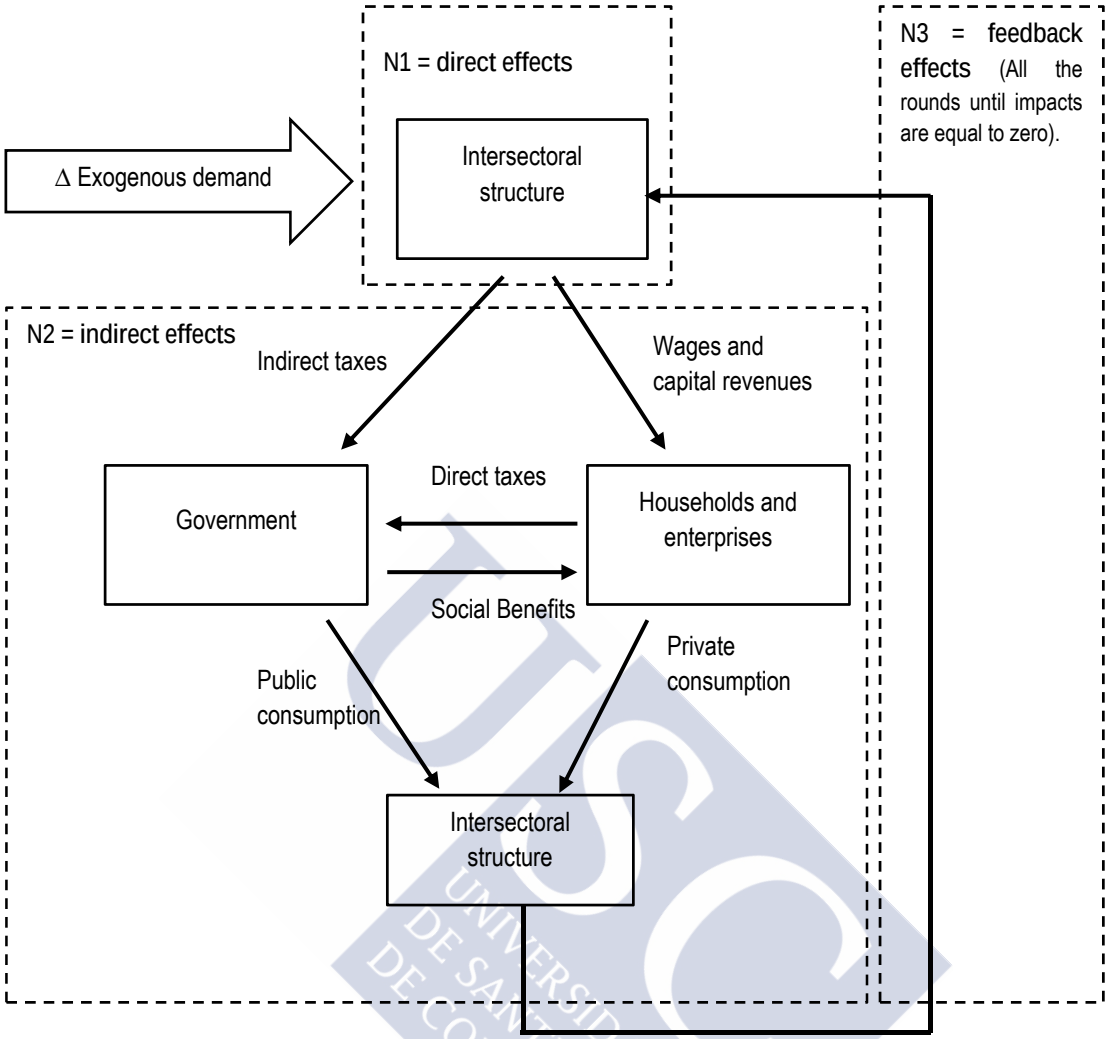
$\boldsymbol{N2}$ is the matrix of indirect multipliers (or "open loop" multipliers):

$$\boldsymbol{N_2 = M_2 M_3 M_1 - M_3 M_1} \quad (30)$$

Finally, $\boldsymbol{N3}$ will be defined as the matrix of feedback multipliers (or "closed loop" multipliers):

$$\boldsymbol{N_3 = M_3 M_1 - M_1} \quad (31)$$

Figure 14 – Overview of the SAM Multiplier decomposition



4. Final demand vector

As we already explained in chapter 2, one important characteristic of the SAMGAL-08 is the treatment of tourism in a separate account. As can be seen in table 34, the national inbound tourism consumption (NITC) is more than four times bigger than the foreign one (FITC). Similarly than in table 33, the most part of the goods and services consumed by inbound visitors are related with tourism characteristic products, but there are also an important consumption of food and beverages, primary products and other services.

Table 34 – Final demand vector of inbound tourism consumption for Galicia 2008

	National Inbound Tourism Consumption (NITC)	Foreign Inbound Tourism Consumption (FITC)	Total Inbound Tourism Consumption (TITC)
s1	63,912	19,328	83,240
s2	0	0	0
s3	88,235	26,684	114,919
s4	4,054	1,226	5,280
s5	1,488	450	1,938
s6	12,682	3,835	16,517
s7	45,550	13,775	59,325
s8	880	266	1,146
s9	1,755	531	2,286
s10	6,339	1,917	8,256
s11	0	0	0
s12	0	0	0
s13	4,210	1,273	5,483
s14	30,450	9,209	39,659
s15	5,300	1,603	6,903
s16	0	0	0
s17	16,725	5,058	21,783
s18	244,581	98,952	343,533
s19	222,697	88,393	311,090
s20	508,731	118,063	626,794
s21	2,142	463	2,605
s22	356,421	20,377	376,798
s23	11,152	5,777	16,929
s24	0	0	0
s25	0	0	0
s26	0	0	0
s27	0	0	0
s28	54,605	11,100	65,705
s29	209,192	23,204	232,396
Total	1,891,101	451,484	2,342,585

Source: SAMGAL08 and Spanish Tourism Satellite Account 2008.

5. Simulation results

5.1. Economic contribution

The economic contribution of inbound tourism can be seen as a synonym of inbound tourism economic significance, i.e. the share of key macroeconomic variables (GDP, GVA, Household income or number of jobs) that correspond to the expenditures made by inbound visitors. Taking into account the data and the methodology that was presented previously and considering the savings-investment and the foreign accounts exogenous, we present the results of some simulations this section.

As Table 35 shows, inbound tourism consumption in Galicia represents almost 5% of total domestic output and 5.85% of the GVA. As expected, the main contribution is made by the national inbound profile. Regarding the results in the labor market, we can see that inbound tourism consumption affects more to the medium-skilled wage-earners

(6.34% of W3 and 5.88% of W2) and to the Gross Operating Surplus (GOS), which includes capital revenues and self-employed (5.95%). Focusing on the institutional agents, we can see that there are not too many differences in households by income level. However, high-income households (HI HH) depend more on inbound tourism consumption than low-income households (LI HH), 5.78% and 5.74% respectively. Also, the economic contribution on government revenues and taxes is lower than the results of the GVA (5.75% for the central government and 5.44% for the regional one), as could be expected due to the low tax rates of tourism activities in Spain.

While economic contribution measures the size and overall significance of tourism within an economy, the economic impact refers to the changes in the final demand vector. Therefore these two terms are different. In this type of analysis this is measured through economic multipliers, which show the effect of an additional euro of tourism consumption.

Table 35 also displays the results on multipliers. Therefore, for the year 2008, €3.47 of domestic production is needed to satisfy one additional euro of inbound tourism demand, and €1.33 of that amount is GVA. This additional euro generates €1.31 of disposable income for the households, €0.40 for the central government, and €0.25 for the regional one.

Table 35 – Economic contribution of tourism consumption in Galicia 2008

	FITC			NITC			TITC		
		%	M		%	M		%	M
F	451.484	0,92%		1.891.101	3,87%		2.342.585	4,79%	
X	1.531.140	0,94%	3,39	6.590.658	4,03%	3,49	8.121.798	4,97%	3,47
W	230.677	1,09%	0,51	983.589	4,65%	0,52	1.214.267	5,74%	0,52
W1	45.490	1,03%	0,10	188.329	4,25%	0,10	233.819	5,28%	0,10
W2	51.148	1,16%	0,11	207.287	4,72%	0,11	258.435	5,88%	0,11
W3	42.212	1,21%	0,09	179.509	5,13%	0,09	221.721	6,34%	0,09
W4	91.827	1,04%	0,20	408.464	4,63%	0,22	500.292	5,67%	0,21
GOS	250.335	0,97%	0,55	1.290.665	4,98%	0,68	1.541.000	5,95%	0,66
GVA	544.688	1,03%	1,21	2.559.261	4,83%	1,35	3.103.949	5,85%	1,33
HH	554.892	1,04%	1,23	2.512.616	4,73%	1,33	3.067.508	5,77%	1,31
LI HH	64.039	1,03%	0,14	292.308	4,71%	0,15	356.348	5,74%	0,15
MLI HH	80.341	1,04%	0,18	363.276	4,72%	0,19	443.617	5,76%	0,19
MHI HH	156.604	1,05%	0,35	701.308	4,71%	0,37	857.912	5,77%	0,37
HI HH	253.908	1,04%	0,56	1.155.723	4,74%	0,61	1.409.631	5,78%	0,60
CGV	169.460	1,04%	0,38	768.070	4,71%	0,41	937.530	5,75%	0,40
RGV	104.436	0,97%	0,23	482.196	4,48%	0,25	586.632	5,44%	0,25
EN	142.058	0,97%	0,31	724.821	4,95%	0,38	866.879	5,92%	0,37
DT	53.847	1,03%	0,12	251.194	4,78%	0,13	305.041	5,81%	0,13
VAT	31.644	1,07%	0,07	133.855	4,51%	0,07	165.499	5,57%	0,07
ST	16.269	0,89%	0,04	68.171	3,71%	0,04	84.440	4,60%	0,04

Comparing between profiles, national inbound tourism consumption has higher impact than foreign on domestic output, disposable income for the households, for enterprises and, especially, for the gross operating surplus (related to the higher consumption of real estate activities).

5.2. Distributive effects

For a better analysis of the distributive effects, in this section we are going to present the results applying the additive decomposition explained before.

Industrial sectors

Therefore, starting by examining the results for industrial sectors, we can see in Table 36 that the main effect is the direct one (n1) for all profiles, followed by the feedback effects (n3). However, national inbound tourism consumption presents higher results for indirect and feedback effects (and therefore is less related to the tourism effect itself and more to the economic structure) than the foreign one.

The industrial sectors that appear to be directly affected by inbound tourism consumption are the most characteristic tourism activities (accommodation services, restaurant services, and transport), but also rental services, primary products, and food and beverage products which are strongly backward linked with those first mentioned.

Regarding indirect effects, the public administration, educational services, and health services stand out among the others. Almost 40% of the total impact on these sectors are caused by the subsequent flows through the economic structure (similar to the first round of induced effects in an augmented input-output analysis).

Finally, following all the rounds until the effects are equal to zero we get the feedback effects. The higher $\boldsymbol{N3}$ multipliers are for food and beverage products, restaurant services, and real estate activities, which are the main activities consumed by resident households.

Table 36 – Results for industrial sectors with the additive multiplier decomposition

	FITC				NITC				TITC			
	n1	n2	n3	Total	n1	n2	n3	Total	n1	n2	n3	Total
s1	0.09	0.01	0.06	0.17	0.07	0.02	0.07	0.16	0.08	0.01	0.07	0.16
s2	0.04	0.01	0.03	0.08	0.03	0.01	0.03	0.07	0.03	0.01	0.03	0.07
s3	0.16	0.03	0.15	0.35	0.15	0.04	0.16	0.35	0.15	0.04	0.16	0.35
s4	0.01	0.01	0.06	0.08	0.01	0.01	0.06	0.08	0.01	0.01	0.06	0.08
s5	0.01	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01
s6	0.02	0.00	0.01	0.03	0.01	0.00	0.01	0.03	0.02	0.00	0.01	0.03
s7	0.08	0.01	0.05	0.15	0.06	0.01	0.06	0.13	0.07	0.01	0.05	0.13
s8	0.03	0.02	0.06	0.10	0.02	0.02	0.06	0.11	0.02	0.02	0.06	0.11
s9	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02
s10	0.02	0.01	0.03	0.06	0.02	0.01	0.03	0.06	0.02	0.01	0.03	0.06
s11	0.01	0.01	0.03	0.04	0.01	0.01	0.03	0.04	0.01	0.01	0.03	0.04
s12	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02
s13	0.01	0.01	0.03	0.04	0.01	0.01	0.03	0.04	0.01	0.01	0.03	0.04
s14	0.05	0.01	0.04	0.10	0.04	0.01	0.04	0.10	0.05	0.01	0.04	0.10
s15	0.03	0.01	0.05	0.09	0.02	0.01	0.05	0.09	0.03	0.01	0.05	0.09
s16	0.03	0.01	0.04	0.08	0.05	0.01	0.04	0.11	0.05	0.01	0.04	0.10
s17	0.02	0.01	0.02	0.05	0.02	0.01	0.02	0.05	0.02	0.01	0.02	0.05
s18	0.29	0.01	0.05	0.35	0.18	0.01	0.05	0.25	0.20	0.01	0.05	0.27
s19	0.20	0.00	0.02	0.22	0.12	0.00	0.02	0.15	0.14	0.00	0.02	0.16
s20	0.26	0.02	0.11	0.40	0.27	0.03	0.12	0.42	0.27	0.03	0.12	0.42
s21	0.04	0.01	0.06	0.11	0.04	0.01	0.06	0.12	0.04	0.01	0.06	0.12
s22	0.07	0.02	0.09	0.18	0.21	0.02	0.09	0.33	0.18	0.02	0.09	0.30
s23	0.02	0.00	0.01	0.03	0.01	0.00	0.01	0.02	0.01	0.00	0.01	0.02
s24	0.05	0.02	0.06	0.13	0.05	0.02	0.06	0.13	0.05	0.02	0.06	0.13
s25	0.00	0.03	0.06	0.09	0.00	0.03	0.07	0.10	0.00	0.03	0.07	0.10
s26	0.00	0.03	0.04	0.07	0.00	0.03	0.05	0.08	0.00	0.03	0.04	0.07
s27	0.00	0.03	0.05	0.09	0.00	0.04	0.06	0.09	0.00	0.03	0.06	0.09
s28	0.04	0.02	0.08	0.14	0.05	0.02	0.08	0.16	0.05	0.02	0.08	0.15
s29	0.06	0.02	0.05	0.12	0.12	0.02	0.05	0.19	0.11	0.02	0.05	0.17
Total	1.66	0.38	1.34	3.39	1.61	0.42	1.46	3.49	1.62	0.41	1.43	3.47

When comparing profiles, we do not notice any large differences among them. The most significant differences appear in the direct multipliers due to variations on the products consumed, as is explained in the introduction. The multipliers are relatively higher for foreign inbound tourism consumption on transport and on accommodation services, while for that of national inbound on real estate activities and other services.

Institutional agents

As the majority of the effect of the institutional agents will appear in n2, we decided to present results as a percentage over their total impact[13], as shown in Table 37.

Starting with the results of the labor market, we can see that the less skilled the wage earner, the higher dependence on the indirect effects. This part of the earnings channel

[13] The total impact was reflected in Table 35 in the multipliers column.

is clearly redistributive; however it is compensated by the high importance of the indirect effects for GOS (90.72%). If we combine these results with those already presented in Table 35, we can conclude that the distribution of self-employment revenues (with a multiplier of 0.66) plays a more important role than wages (0.52) in the earnings channel and, as seen in Table 23, mixed revenues are more important for medium and high-income households.

Regarding the results for the governments and taxes, the largest part of their impact comes from indirect effects. Nevertheless, there are differences among taxes. Indirect taxes have a relatively higher dependence on the feedback effect than direct taxes; mainly provoked by low VAT rates in tourism activities. (Nowadays they are included in the reduced rate of 10%.)

Table 37 – Results for institutional agents decomposed in percentage over their total impact

	FITC				NITC				TTIC			
	n1	n2	n3	Total	n1	n2	n3	Total	n1	n2	n3	Total
Wages	0.00%	**85.44%**	14.56%	100.00%	0.00%	**84.39%**	15.61%	100.00%	0.00%	**84.59%**	15.41%	100.00%
W1	0.00%	**90.46%**	9.54%	100.00%	0.00%	**89.52%**	10.48%	100.00%	0.00%	**89.70%**	10.30%	100.00%
W2	0.00%	**90.68%**	9.32%	100.00%	0.00%	**89.55%**	10.45%	100.00%	0.00%	**89.77%**	10.23%	100.00%
W3	0.00%	**87.41%**	12.59%	100.00%	0.00%	**86.51%**	13.49%	100.00%	0.00%	**86.68%**	13.32%	100.00%
W4	0.00%	**79.14%**	20.86%	100.00%	0.00%	**78.49%**	21.51%	100.00%	0.00%	**78.61%**	21.39%	100.00%
GOS/GMR	0.00%	**90.72%**	9.28%	100.00%	0.00%	**91.86%**	8.14%	100.00%	0.00%	**91.68%**	8.32%	100.00%
GVA	0.00%	**87.85%**	12.15%	100.00%	0.00%	**88.15%**	11.85%	100.00%	0.00%	**88.09%**	11.91%	100.00%
HHs	0.00%	**98.41%**	1.59%	100.00%	0.00%	**98.41%**	1.59%	100.00%	0.00%	**98.41%**	1.59%	100.00%
LI HH	0.00%	**98.14%**	1.86%	100.00%	0.00%	**98.15%**	1.85%	100.00%	0.00%	**98.15%**	1.85%	100.00%
LMI HH	0.00%	**98.39%**	1.61%	100.00%	0.00%	**98.39%**	1.61%	100.00%	0.00%	**98.39%**	1.61%	100.00%
HMI HH	0.00%	**98.47%**	1.53%	100.00%	0.00%	**98.45%**	1.55%	100.00%	0.00%	**98.45%**	1.55%	100.00%
HI HH	0.00%	**98.46%**	1.54%	100.00%	0.00%	**98.47%**	1.53%	100.00%	0.00%	**98.47%**	1.53%	100.00%
CGV	0.00%	**97.72%**	2.28%	100.00%	0.00%	**97.72%**	2.28%	100.00%	0.00%	**97.72%**	2.28%	100.00%
RGV	0.00%	**95.70%**	4.30%	100.00%	0.00%	**95.79%**	4.21%	100.00%	0.00%	**95.77%**	4.23%	100.00%
EN	0.00%	**98.90%**	1.10%	100.00%	0.00%	**99.02%**	0.98%	100.00%	0.00%	**99.00%**	1.00%	100.00%
DT	0.00%	**98.53%**	1.47%	100.00%	0.00%	**98.57%**	1.43%	100.00%	0.00%	**98.56%**	1.44%	100.00%
VAT	0.00%	**91.37%**	8.63%	100.00%	0.00%	**90.76%**	9.24%	100.00%	0.00%	**90.87%**	9.13%	100.00%
ST	0.00%	**89.77%**	10.23%	100.00%	0.00%	**88.96%**	11.04%	100.00%	0.00%	**89.12%**	10.88%	100.00%

Therefore, all of these results make that the differences on disposable income of the households by level of income are not so big. Medium and high-income households are slightly more dependent on indirect effects. Additionally with the results from Table 35, it can be observed that in Galicia, inbound tourism consumption is not redistributive or pro-poor, according to the results of previous papers in Thailand (Wattanakuljarus and Coxhead, 2008), Brazil (Blake *et al.*, 2008) and East-Africa (Blake, 2008).

Distinguishing between profiles, combining results of Table 35 and 37 again, foreign inbound tourism consumption appears to contribute relatively more to less-skilled wage

earners, and less so to high-income households. The higher consumption in accommodation services (despite its small size) as opposed to real estate activities reduces the contribution to the Gross Operating Surplus.

6. Main conclusions

This chapter provides an economy-wide analysis of distributional effects of inbound tourism consumption in Galicia, in attempt to be the first step in answering whether or not, and how tourism activities can be redistributive, as is usually assumed in regional development strategies. As previously explained, the ways in which tourism consumption affects income distribution involves three channels: changes in prices, household earnings, and government revenues. In this study, we focus our analysis on the last two channels through a social accounting matrix (SAM) model of Galicia for the year 2008.

Results show that the Galician economy depends most notably on the performance of inbound tourism consumption. It represents almost 5% of the total domestic output and 5.85% of the GVA. The industrial sectors that appear to be directly affected by inbound tourism consumption are the most characteristic tourism activities (accommodation services, restaurant services, and transport), but also rental services, primary products and the food and beverages products which are strongly backward linked with those first mentioned. These are also the ones that present bigger total multipliers.

Regarding the results in the labor market, we can see that inbound tourism consumption affects to a higher extent medium-skilled wage earners and to the Gross Operating Surplus (GOS), which includes capital revenues and self-employed. Additionally, the multiplier is significantly higher for GOS (0.66) than for wages (0.52). Therefore, in the earnings channel the distribution of self-employment revenues plays a more important role than wages.

The economic contribution of government revenues and taxes is lower than the results of the GVA (5.75% for the central government and 5.44% for the regional one). Moreover, indirect taxes have a relatively higher dependence on the feedback effect than direct taxes; mainly provoked by low VAT rates in tourism activities.

As a general result, we cannot see many differences in households by income level (however, high-income households depend more on inbound tourism consumption than low-income households, 5.78% and 5.74% respectively). Consequently, the possible redistributive effect from governments due to social benefits does not compensate the earnings channel and more development policies must be designed to correct these distortions. Distinguishing between profiles, foreign inbound tourism consumption appears to contribute relatively more to less-skilled wage earners and less to high-income households, being more pro-poor than national inbound tourism consumption.

Further research using a CGE model that allows us to compute the price channel would also be of interest. Additionally, applying the analysis to domestic tourism as well poses new methodological challenges. However, from this analysis several conclusions about the distributional effects of inbound tourism in Galicia can be drawn, and from these some questions can be answered in order to help to better understand tourism as an economic phenomenon.

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Chapter 04:

Welfare effects of tourism: Some preliminary findings with a CGE model for Galicia

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1. Introduction

As we stated in the last chapter, tourism activities can make social and economic inequalities deeper. Additionally, the better way of determining the degree of participation of low-income population is not through disposable income measures, but from a welfare point of view. This takes into account not only revenues gained from tourism but also the access to tourism products and the subsequent utility generated.

Furthermore, during the current economic crisis, different tourism policies have been applied in Spain, such as the "tourism tax" in Catalonia, in order to increase revenues for the regional governments. This can imply a change in the level of prices, the number of overnights stays, overall consumption of visitors and, consequently, on disposable income and welfare of domestic households, among others.

Therefore, the main aim of this chapter is to evaluate, in terms of welfare, the economic consequences of an expansion in tourism consumption and different tourism policies in a regional economy like Galicia, through a CGE model. As a first attempt, we developed a basic static regional CGE model for Galicia calibrated with the 2008 SAM, explained in Chapter 2. Results of impact simulations and increases in Value-Added Tax (VAT) for tourism characteristic activities are presented as different simulation scenarios.

CGE models can be defined as a system of non-linear equations obtained from the optimized behaviour of the main economic and institutional agents. In this kind of models, the equilibrium (supply equals demand in all markets) is achieved with adjustments in prices and quantities at the same time, describing the circular flow of income and the possible substitutions between consumption and factors derived from elasticities. In this sense, CGE models are designed to serve for empirical analysis and the evaluation of economic policies.

In the next section of this chapter we present a literature review regarding CGE models and their application to tourism issues. Sections 3 and 4 describe the characteristics of the CGE model proposed and explain the functional forms used, as well as the closure rule chosen. After this, we explain the steps for the calibration in Section 5. Then, we present three scenarios with a ten per cent increase in inbound tourism consumption and four tourism taxation scenarios, increasing the value-added tax on tourism products and

the results obtained in Section 6. Finally, the last section shows the main conclusions drawn from this fourth chapter.

2. CGE models applied to tourism

In this section we will briefly review the main applications of CGE models in tourism economics. Despite the fact that tourism lends itself to CGE analysis as it is, by nature, a multi-sector activity (Blake, 2000), there is not extensive literature analyzing issues related to tourism using this methodology (Dwyer, Forsyth and Spurr (2004), Blake, Gillham and Sinclair (2006) and Laffargue (2009)). We can divide this literature into four sub-topics: taxing foreign tourism, tourism and poverty, interregional effects of tourism and impact studies. At the end of the section, we also add some regional examples of CGE models applied to Spanish regions.

Taxing foreign tourism

The monopoly that the government has on the market of products consumed by visitors can be used to extract income from them through taxes, which can either be levied on tourism businesses or directly on visitors. The degree of inelasticity of demand depends mostly on the degree of differentiation of the destination and affects this ability to tax. The greater the degree of differentiation of the destination, the more inelastic demand will be and, therefore, the greater the possibility of taxation as Gooroochurn and Sinclair (2003) explain.

A model for analysing the effects of an increase in the levels of taxation on foreign tourism in Spain is elaborated in Blake (2000). In this paper, results show that this increase in tax rates will cause a welfare gain for the residents, since visitors are the ones that receive most of the negative effects of the tax and the consequent decrease in welfare.

Gooroochurn and Sinclair (2005) presented a similar study for the economy of Mauritius finding also that taxing foreign visitors increases domestic welfare. Another outcome in this paper is that increasing taxes on tourism-related sectors also reduces income inequality, since richer households have a higher proportion of consumption of tourism products than low-income ones.

Tourism and poverty

CGE models also allow us to show how the circular flow of income works and, hence, the response of different types of households to exogenous shocks. Based on this income distribution mechanism, tourism consumption and its possible effects on income inequality and poverty levels of an economy can easily be associated.

As was already indicated in chapter 3, Wattanakuljarus and Coxhead (2008) presented some simulations for Thailand with a CGE model revealing that, although tourism growth benefits all household classes, high-income and non-agricultural households receive the greatest gains.

Another study that implements a CGE model in order to calculate the effects of tourism on poverty relief and income redistribution in Brazil is Blake, Arabache, Sinclair and Teles (2008). The results show that low-income households benefit, but less than some higher income groups. Therefore, both papers conclude that tourism demand expansion is not pro-poor as is often assumed.

Interregional effects

Adams and Parmenter (1995) analyze the effects of an additional ten per cent expansion in tourist arrivals using the ORANI model for Australia. This interregional model shows that regions within the country can be affected differently during a tourism boom. In particular, the state of Queensland experienced a negative effect in its domestic product due to the decline of traditional exports, and Victoria (having one of the major airports in the country) had better results overall.

Impact studies

The most typical analysis in tourism and CGE models is evaluating the impact of a change (rise or fall) in tourism demand (generally inbound) on an economy. Along these lines, Zhou, Yanagida, Chakravorty and Leung (1997) among other examples, study the economic impact of a ten per cent decline of visitor expenditures in Hawaii. They conclude that this decrease will largely affect the industries closely related to tourism (accommodation and transport services, and eating and drinking industries), as expected. Other similar papers that provide quantitative estimations of tourism impact are Sugiyarto, Blake and Sinclair (2003) for Indonesia or Madden and Thapa (2000) for Australia.

Regional cases in Spain

Although tourism plays a very important role in the Spanish economy and there are several studies applying CGE models to analyze different topics at a regional level such as tax reforms (Cardenete and Sancho (2003) and Cardenete (2004) for Andalusia and Llop and Manresa (2004) for Catalonia) or environmental policies (Manresa and Sancho (2004) for Catalonia, Cardenete, Fuentes and Polo (2008) for Andalusia and De Miguel, Cardenete and Pérez (2009) for Extremadura), to our knowledge, there is only one paper studying the regional effects of tourism: Polo and Valle (2008) for the Balearic Islands.

In this paper, Polo and Valle present a comparison of the effects of a ten per cent decline in visitors' expenditures in the Balearic Island economy using an IO, a SAM, and a CGE model. These models were implemented with the 1997 IO table and a SAM constructed by the authors for the same year. The CGE model used is a static regional model with 24 sectors, one representative household, two governments (regional and central) and one foreign sector. Depending on the closure rule selected, results can vary from a 0.31% positive change of the real GDP with the savings driven closure to a -4.44% change with the Keynesian closure.

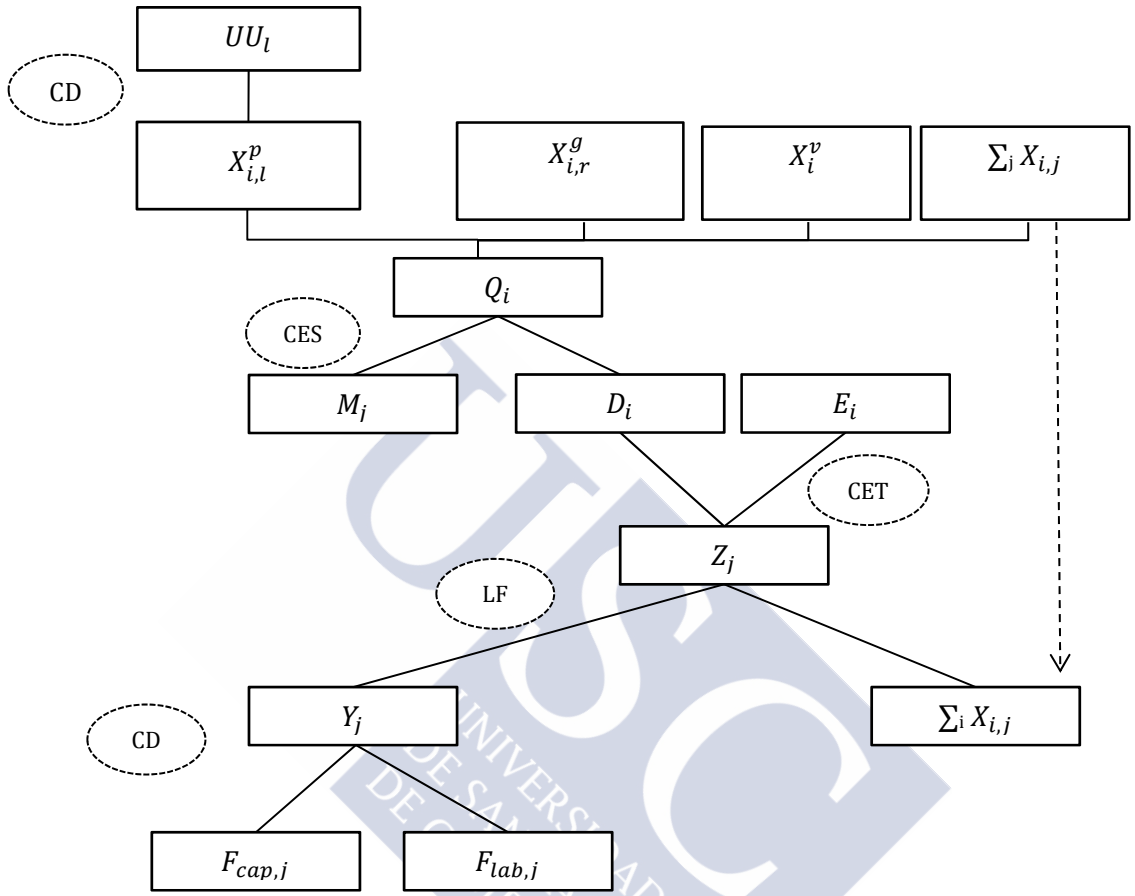
3. Model specification for Galicia

The model is a static regional model based on the standard CGE model presented in Hosoe *et al*. (2010), similar to the models of Condon *et al*. (1987) and Dervis *et al*. (1981), and it is calibrated with the 2008 Galician SAM. Figure 15 offers a general idea of the standard CGE model and its functional forms.

Capital and labor ($F_{cap,j}$ and $F_{lab,j}$) are aggregated into the composite factor (Y_j) using a Cobb-Douglas function. This composite factor is combined with the intermediate inputs ($\sum i\ X_{i,j}$) to produce the total output (Z_j) using a Leontief function. The total output is transformed into exports (E_i) and domestic goods and services (D_i) using a Constant Elasticity of Transformation function. The domestic good is combined with imports (M_j) to produce the composite Armington's good (Q_i) with a Constant Elasticity of Substitution function. At this point supply meets demand. The Armington composite good is distributed among households consumption, governments consumption, investment and intermediate uses ($X_{i,l}^{p}$, $X_{i,r}^{g}$, X_i^v and $\sum_j X_{i,j}$). Finally, households utility

(UU_l) is generated by the consumption of tourism characteristic products and non-tourism products using a Cobb-Douglas.

Figure 15 - Overview of the CGE model specification and its functional forms*



*CD stands for a Cobb-Douglas function, CES for a constant elasticity of substitution type of function, CET for a constant elasticity of transformation function and LF for a Leontief type of function

UU_l – *Utility*

$X_{i,l}^p$ – *Household consumption*

$X_{i,r}^g$ – *Government consumption*

X_i^v – *Investment*

$\sum j\ X_{i,j}$ – *Intermediate uses*

Q_i – *Composite good (Armington good)*

$F_{cap,j}$ *and* $F_{lab,j}$ – *Productive Factors*

M_j – *Imports*

D_i – *Domestic good*

E_i – *Exports*

Z_j – *Total Output*

Y_j – *Composite factor (value-added)*

$\sum i\ X_{i,j}$ – *Intermediate inputs*

3.1. Intermediate inputs and production

We need to divide the production process into two stages. In the first stage, capital and labor ($F_{cap,j}$ and $F_{lab,j}$) are used for the production of value-added (as a composite factor (Y_j)). In the second stage, this composite factor is combined with intermediates inputs ($\sum i\, X_{i,j}$) to produce total output (Z_j). We assumed a Cobb-Douglas-type production function for the first phase and a Leontief-type function for the second one. Both are homogenous of degree one, i.e. they present constant returns to scale.

The profit maximization problem for the j-th industrial sector can be written as follows:

$$\boldsymbol{max\ \pi_j^y = p_j^y Y_j - \sum_h p_h^f F_{h,j}} \qquad (32)$$

Subject to:

$$\boldsymbol{Y_j = b_j \prod_h F_{h,j}^{\beta_{h,j}}} \qquad (33)$$

And, for the second stage:

$$\boldsymbol{max\ \pi_j^z = p_j^z Z_j - (p_j^y Y_j + \sum_i p_i^q X_{i,j})} \qquad (34)$$

Subject to:

$$\boldsymbol{Z_j = min\left(\frac{X_{i,j}}{ax_{i,j}}, \frac{Y_j}{ay_j}\right)} \qquad (35)$$

Solving these two problems, we obtain:

$$\boldsymbol{Y_j = b_j \prod_h F_{h,j}^{\beta_{h,j}} \ \ \forall j} \qquad (36)$$

$$\boldsymbol{F_{h,j} = \frac{\beta_{h,j} p_j^y}{p_h^f} Y_j \ \ \forall h,j} \qquad (37)$$

$$\boldsymbol{X_{i,j} = ax_{i,j} Z_j \ \ \forall i,j} \qquad (38)$$

$$\boldsymbol{Y_j = ay_j Z_j \ \ \forall j} \qquad (39)$$

And, for computational purposes, we replace $Z_j = \min\left(\frac{X_{i,j}}{ax_{i,j}}, \frac{Y_j}{ay_j}\right)$ with a zero-profit condition:

$$\boldsymbol{\pi_j^z = \ p_j^z Z_j - \left(p_j^y Y_j + \sum_i p_i^q X_{i,j}\right) = 0 \ \ \forall j} \qquad (40)$$

We can transform it into a simpler expression of a unit cost function, replacing Y_j and $X_{i,j}$, we get:

$$\boldsymbol{p_j^z Z_j - \left(ay_j p_j^y Z_j + \sum_i ax_{i,j} p_i^q Z_j\right) = 0 \ \ \forall j} \qquad (41)$$

And, finally, eliminating Z_j, we obtain:

$$\boldsymbol{p_j^z = ay_j p_j^y + \sum_i ax_{i,j} p_i^q \ \ \forall j} \qquad (42)$$

In our model we consider 22 sectors, Table 38, (one primary, three energy-related, ten industrial, one construction, six services; 20 tradable and two non-tradable; and following the Spanish TSA, 16 non-characteristic tourism products and six tourism characteristic activities) and two factors, labor and capital.

Table 38 – Sector codes and tourism and trade conditions

Sector Code	Activities	Sector code in the SAMGAL-08	Trade condition	Tourism condition
1	Primary sector	1	Tradable	Non-characteristic
2	Mining and quarrying products	2	Tradable	Non-characteristic
3	Food products and beverages	3	Tradable	Non-characteristic
4	Textiles, furs and leather	4	Tradable	Non-characteristic
5	Wood and products of wood and cork	5	Tradable	Non-characteristic
6	Pulp, paper and paper products	6	Tradable	Non-characteristic
7	Coke, refined petroleum products and nuclear fuels	7	Tradable	Non-characteristic
8	Chemicals, rubber and plastic products	8	Tradable	Non-characteristic
9	Other non-metallic mineral products	9	Tradable	Non-characteristic
10	Metallurgy and other basic metals	10	Tradable	Non-characteristic
11	Machinery and equipment	11, 12	Tradable	Non-characteristic
12	Motor vehicles, and other transport equipment	13	Tradable	Non-characteristic
13	Electrical energy, gas, steam and hot water	14	Tradable	Non-characteristic
14	Other manufactured goods	15	Tradable	Non-characteristic
15	Construction work	16	Non-Tradable	Non-characteristic
16	Public administration and defence services	25, 26, 27	Non-Tradable	Non-characteristic
17	Transport and communicating services	18	Tradable	Characteristic
18	Accommodation services	19	Tradable	Characteristic
19	Restaurant services	20	Tradable	Characteristic
20	Cultural and sport services	28	Tradable	Characteristic
21	Rental services	23	Tradable	Characteristic
22	Other services	17, 21, 22, 24, 29	Tradable	Characteristic

3.2. Households

In the model the eight households considered aim to sell their endowments of factors to earn income and maximize their utility through the consumption of goods and services. Households maximize their utility using a Cobb-Douglas subject to their budget constraint as follows:

$$\boldsymbol{max\ UU_l = \prod_i X_{i,l}^{p^{\alpha_{i,l}}}} \qquad (43)$$

Subject to:

$$\boldsymbol{\sum_i p_i^q X_{i,l}^p = \sum_h p_h^f FF_{l,h} - S_l^p - T_l^d - \sum_r Td_{r,l} + \sum_r TRd_{l,r} - Thhcrp_l + TRcrphh_l} \qquad (44)$$

Where:

$$\sum_h p_h^f FF_{l,h} - S_l^p - T_l^d - \sum_r Td_{r,l} + \sum_r TRd_{l,r} - Thhcrp_l + TRcrphh_l = NDI_l \quad (45)$$

Therefore, the net disposable income of the households (NDI_l) is equal to the revenues received by selling their factors of production ($\sum_h p_h^f FF_{l,h}$), in addition with the transfers that come from other institutional sectors, governments ($\sum_r TRd_{l,r}$) and firms ($TRcrphh_l$) and minus income taxes paid (T_l^d), the transfers they pay to the governments ($\sum_r Td_{r,l}$) and to firms ($Thhcrp_l$) and their savings (S_l^p).

Solving this standard household model, we obtain the household demand function for the i-th good:

$$X_{i,l}^p = \frac{\alpha_{i,l}}{p_i^q}(NDI_l) \quad \forall i \quad (46)$$

It increases with a decline in prices (p_i^q) or with an increase in net disposable income (NDI_l).

3.3. Governments, taxes and transfers

Governments collect taxes, consume goods and pay/receive transfers to/from other institutional sectors. In our model, we consider two governments, central and regional (including local), distinguishing between seven types of taxes.

Their demand function can be written as follows:

$$X_{i,r}^g = \frac{\mu_{i,r}}{p_i^q}(NDI_r) \quad \forall i \quad (47)$$

Where:

$$\left(RT_r^d + RT_r^{vat} + RT_r^{et} + RT_r^{otp} + RT_r^{ssc} + RT_r^{cp} + RT_r^m\right) + TRrg_r - TRpg_r + \sum_l Td_{r,l} - \sum_l TRd_{l,r} + TRrcp_r - TRpcp_r - S_r^g = NDI_r \quad (48)$$

Thus, the net disposable income of the governments (NDI_r) is equal to the revenues received from taxes (income tax RT_r^d, value-added tax RT_r^{vat}, excise tax RT_r^{et}, other

taxes on production RT_r^{otp}, social security contributions RT_r^{ssc}, corporations tax RT_r^{cp} and tariffs RT_r^m), and transfers from the other government ($TRrg_r$), from households ($\sum_l Td_{r,l}$) and from corporations ($TRrcp_r$), minus transfers paid to the other institutional sectors ($TRpg_r$, $\sum_l TRd_{l,r}$, $TRpcp_r$) and public savings (S_r^g).

Income taxes paid by households are defined as follows:

$$\boldsymbol{T_l^d = \tau_l{}^d\left(\sum_h p_h^f FF_{l,h} + \sum_r TRd_{l,r} + TRcrphh_l\right)} \qquad (49)$$

Value Added tax paid by production sector:

$$\boldsymbol{T_j^{vat} = \tau_j{}^{vat} p_j^z Z_j} \qquad (50)$$

Excise taxes:

$$\boldsymbol{T_j^{et} = \tau_j{}^{et} p_j^z Z_j} \qquad (51)$$

Other taxes on production:

$$\boldsymbol{T_j^{otp} = \tau_j{}^{otp} p_j^z Z_j} \qquad (52)$$

Social security contributions[14]:

$$\boldsymbol{T_j^{ssc} = \tau_j{}^{ssc}(p_{LAB}^f F_{LAB,j})} \qquad (53)$$

Corporation tax paid by firms:

$$\boldsymbol{T^{cp} = \tau^{cp}(p_{CAP}^f FF^{cp} + \sum_l Thhcp_l + \sum_r Tgcp_r)} \qquad (54)$$

[14] It must be noted that we need to change parts of the SNA-SAM presented in chapter 2 in order to better modelling the economic structure from a CGE perspective. In the SNA framework, Social Security Contributions (SSC) appear included as part of the household revenues derived from its labor endowments and then paid to the central government. In the CGE we are going to incorporate SSC as another indirect tax on labor, modifying its cost.

And finally, tariffs:

$$\boldsymbol{T_j^m = \tau_j{}^m p_j^m M_j} \qquad (55)$$

As previously explained, these taxes also represent revenue for the governments shared in the percentage that appears in Table 39.

Table 39 – Share of revenues from the different taxes

	Central government share	Regional government share
Income tax	66%	34%
VAT	51%	49%
Excise taxes	8%	92%
Other taxes on production	4%	96%
Social Security contributions	100%	0%
Corporation tax	100%	0%
Tariffs	100%	0%

Transfers are introduced into the model in a similar way as taxes, i.e. as a fixed proportion of revenues of the institutional agent that gives the transfer.

From government to households:

$$\boldsymbol{\sum_l TRd_{l,r} = \varsigma_r{}^{rd}(RT_r^d + RT_r^{vat} + RT_r^{et} + RT_r^{otp} + RT_r^{ssc} + RT_r^{cp} + RT_r^m + TRrg_r + \sum_l Td_{r,l} + TRrcp_r)} \qquad (56)$$

From households to governments:

$$\boldsymbol{\sum_r Td_{r,l} = \varsigma_l{}^{dt}\left(\sum_h p_h^f FF_{l,h} + \sum_r TRd_{l,r} + TRcrphh_l\right)} \qquad (57)$$

From governments to governments:

$$\boldsymbol{TRrg_r = \varsigma_r{}^{govt}(RT_r^d + RT_r^{vat} + RT_r^{et} + RT_r^{otp} + RT_r^{ssc} + RT_r^{cp} + RT_r^m + TRrg_r + \sum_l Td_{r,l} + TRrcp_r)} \qquad (58)$$

From governments to corporations:

$$\boldsymbol{TRpcp_r = \varsigma_r^{gct}(RT_r^d + RT_r^{vat} + RT_r^{et} + RT_r^{otp} + RT_r^{ssc} + RT_r^{cp} + RT_r^m + TRrg_r + \sum_l Td_{r,l} + TRrcp_r)} \quad (59)$$

From corporations to governments:

$$\boldsymbol{TRrcp_r = \varsigma^{cgt}(p_{CAP}^f FF^{cp} + \sum_l Thhcp_l + \sum_r Tgcp_r)} \quad (60)$$

From households to corporations:

$$\boldsymbol{Thhcrp_l = \varsigma_l^{hht}\left(\sum_h p_h^f FF_{l,h} + \sum_r TRd_{l,r} + TRcrphh_l\right)} \quad (61)$$

From corporations to households:

$$\boldsymbol{\sum_l TRcrphh_l = \varsigma^{cpt}(p_{CAP}^f FF^{cp} + \sum_l Thhcp_l + \sum_r Tgcp_r)} \quad (62)$$

3.4. Corporations

As an institutional sector, corporations (financial and non-financial) are considered as intermediate agents in the model receiving income from their endowments of capital, paying direct taxes and saving.

Therefore:

$$\boldsymbol{FF^{cp} = sf^{cp} F_{CAP,j}} \quad (63)$$

Where their revenues (FF^{cp}) come from their endowment of capital as a share of the total capital in the economy ($sf^{cp} F_{CAP,j}$).

Their ability to save is the other important part of the behaviour of corporations. In fact, their savings are the reserves or retained profits, which are earnings not distributed to households. In this case, they can be defined as follow:

$$\boldsymbol{S^{cp} = sp^{cp}(p_{CAP}^f FF^{cp} + \sum_l Thhcp_l + \sum_r Tgcp_r)} \quad (64)$$

Considering total savings (S^{cp}) as a fixed proportion (sp^{cp}) of their disposable income ($(p_{CAP}^f FF^{cp}) + \sum_l Thhcp_l + \sum_r Tgcp_r$).

3.5. Investment and savings

As a static model, introducing dynamic structures like investment and savings is only justified by the internal consistency of the model based on the national accounting system (Willenbockel, 1994).

We can define the investment demand function as:

$$\boldsymbol{X_i^v = \frac{\lambda_i}{p_i^q}\left(\sum_l S_l^p + \sum_r S_r^g + S^{cp} + \varepsilon S^f\right)\ \forall i} \qquad (65)$$

Investment (X_i^v) absorbs all the savings ($\sum_l S_l^p + \sum_r S_r^g + S^{cp} + \varepsilon S^f$) and spends them on goods and services with a constant share (λ_i).

Private savings can be defined as:

$$\boldsymbol{S_l^p = sp_l^p\left(\sum_h p_h^f FF_{l,h} + \sum_r TRd_{l,r} + TRcrphh_l\right)} \qquad (66)$$

Public savings:

$$\boldsymbol{S_r^g = sp_r^g\left(RT_r^d + RT_r^{vat} + RT_r^{et} + RT_r^{otp} + RT_r^{ssc} + RT_r^{cp} + RT_r^m + TRrg_r + \sum_l Td_{r,l} + TRrcp_r\right)} \qquad (67)$$

And corporation savings:

$$\boldsymbol{S^{cp} = sp^{cp}((p_{CAP}^f FF^{cp}) + \sum_l Thhcp_l + \sum_r Tgcp_r)} \qquad (68)$$

Then, we assume that savings are determined by constant propensities for savings by each type of household or government (sp_l^p, sp_r^g, sp^{cp}).

3.6. Trade

When we introduce trade into a CGE model, we are extending the model from a closed to an open economy. We also assume that Galicia is a small country, which means that Galicia has no significant impact on the rest of the world economy. Therefore, export and import prices are exogenously given.

We need to distinguish between two types of prices: prices in terms of the domestic currency and prices in terms of foreign currency. The difference between them is the exchange rate (ε):

$$\boldsymbol{p_i^e = \varepsilon p_i^{We}} \qquad (69)$$

$$\boldsymbol{p_i^m = \varepsilon p_i^{Wm}} \qquad (70)$$

And, we can define also the balance of payments as:

$$\boldsymbol{\sum_i p_i^{We} E_i + S^f = \sum_i p_i^{Wm} M_i} \qquad (71)$$

Where S^f represents the foreign deficit.

3.7. Armington's assumption

As is usually assumed in CGE models, we must distinguish between goods that are domestically produced and those imported, or between goods that are domestically consumed and those exported to avoid cross-hauling problems (two-way trade). The smaller the elasticity of substitution (inelastic), the higher the difference is between these goods with a CES function. This assumption about imperfect substitution between imports and domestic goods is called Armington's assumption (Armington, 1969).

$$\boldsymbol{Q_i = \gamma_i(\delta_i^m M_i^{\eta_i} + \delta_i^d D_i^{\eta_i})^{1/\eta_i}} \qquad (72)$$

$$\boldsymbol{M_i = \left[\frac{\gamma_i^{\eta_i}\delta_i^m p_i^q}{(1+\tau^m)p_i^m}\right]^{1/1-\eta_i} Q_i} \qquad (73)$$

$$\boldsymbol{D_i = \left[\frac{\gamma_i^{\eta_i}\delta_i^d p_i^q}{p_i^d}\right]^{1/1-\eta_i} Q_i} \qquad (74)$$

Where σ_i are equal to the Armington elasticities showed in table 3 and $\eta_i = (\sigma_i - 1)/\sigma_i$.

We also assumed imperfect transformation or substitution between exports and the domestic good supply. We express this transformation process with a constant elasticity transformation function (CET).

$$\boldsymbol{Z_i = \theta_i\left(\xi_i^e E_i^{\varphi_i} + \xi_i^d D_i^{\varphi_i}\right)^{\frac{1}{\varphi_i}}} \qquad (75)$$

$$\boldsymbol{D_i = \left[\frac{\theta_i^{\varphi_i}\xi_i^d(1+\tau^{vat}+\tau^{et}+\tau^{otp})p_i^z}{p_i^d}\right]^{1/1-\varphi_i} Z_i} \qquad (76)$$

Following Hosoe *et al*. (2010), for tax simulations we also consider exports as an endogenous variable (being S^f fixed) in order to capture the effects on the foreign consumption.

$$\boldsymbol{E_i = \left[\frac{\theta_i^{\varphi_i}\xi_i^e(1+\tau^{vat}+\tau^{et}+\tau^{otp})p_i^z}{p_i^e}\right]^{1/1-\varphi_i} Z_i} \qquad (77)$$

Where ψ_i are transformation elasticities and $\varphi_i = (\psi_i + 1)/\psi_i$.

3.8. Market-clearing conditions

The final step in CGE models, once having described the behaviour of the economic agents, is to impose market-clearing conditions, where demand meets supply in all markets:

$$\boldsymbol{Q_i = \sum_l X_{i,l}^p + \sum_r X_{i,r}^g + X_i^v + \sum_j X_{i,j} \quad \forall i} \qquad (78)$$

Labor markets clears:

$$\boldsymbol{\sum_j F_{LAB,j} = \sum_l FF_{l,LAB}} \qquad (79)$$

And capital markets clear:

$$\boldsymbol{\sum_j F_{CAP,j} = \sum_l FF_{l,CAP} + FF^{cp}} \qquad (80)$$

As previously mentioned, investment equals savings, public deficit equals the difference between public expenditure and public revenues and the current account deficit satisfies the restrictions of foreign sectors.

4. Closure rules

There is extensive literature regarding macro closures of CGE models, starting with the first paper of Sen (1963) on this topic. Taylor and Lysy (1979) found that the choice of closure affected the policy simulation results obtained, and therefore selecting the most realistic closure rules for the economy we want to describe is an important matter. Based on the papers of Rattso (1982), Dewatripont and Michel (1987), Thissen (1998), Valle (2004) and Álvarez (2010), we can define different options for choosing a macro closure.

Equilibrium for Factor markets:

- Productive factors are plenty used.
- Productive factors are underused.

Equilibrium for Government behaviour:

- Public consumption is exogenous with fixed tax rates and public savings being flexible.
- Public consumption is exogenous with a fixed propensity for public saving and endogenous tax rates.
- Public consumption is endogenous with a fixed propensity for public saving and fixed tax rates.

Equilibrium for Foreign deficit:

- Foreign savings are fixed and the exchange rate is endogenous.
- Foreign savings are endogenous and the exchange rate is fixed.

Equilibrium for Investment-savings:

- Private investment is endogenous and the propensity for private saving is fixed. (Savings driven).
- Private investment is exogenous and the propensity for private saving is flexible and endogenous. (Investment driven).

In this first attempt of our model, we choose a macroeconomic closure rule that follows the neoclassical equilibrium for factor markets (productive factors are plenty used). We also consider that public consumption is endogenous with a fixed propensity for public savings and fixed tax rates. For the foreign deficit, foreign savings are fixed and the exchange rate is considered as endogenous. And finally, this model is savings driven, so private investment is endogenous and the propensity for private saving is fixed.

5. Calibration of the model

The purpose of the calibration step is to solve the unknown parameters of the system. As usual, we consider that all prices in the model are equal to one in the base year and, then, values in the SAM are equal to quantities (Harberger, 1962). As we already stated, the SAMGAL-08 described in the second chapter is the central database used to specify the scale parameters and the fixed variables of the model (values represented with the superscript 0). In this section, we present the share and scale coefficients of the utility function, production function and the CES and CET trade functions. The rest of the parameters (savings propensities, tax rates and transfers rates) are directly evident from the equations presented in the last section.

Therefore, the expenditure share coefficients in the utility function can be obtained from:

$$\boldsymbol{\alpha_{i,l}} = \frac{\boldsymbol{p_i^{q^0} X_{i,l}^{p^0}}}{\sum_j \boldsymbol{p_j^{q^0} X_{j,l}^{p^0}}} \qquad (81)$$

In the case of the calibration of the input share and the scale coefficients in the production function:

$$\boldsymbol{\beta_{h,j}} = \frac{\boldsymbol{p_h^{f^0} F_{h,j}^0}}{\sum_k \boldsymbol{p_k^{f^0} F_{k,j}^0}} \qquad (82)$$

$$\boldsymbol{b} = \frac{\boldsymbol{Z_j^0}}{\prod_h \boldsymbol{F_{h,j}^{0^{\beta_{h,j}}}}} \qquad (83)$$

For the Leontief-type function:

$$\boldsymbol{ax_{i,j}} = \frac{\boldsymbol{X_{i,j}^0}}{\boldsymbol{Z_j^0}} \qquad (84)$$

$$\boldsymbol{ay_j} = \frac{\boldsymbol{Y_j^0}}{\boldsymbol{Z_j^0}} \qquad (85)$$

In the case of the calibration of the CES function (for the tradable sectors), the share coefficients are calculated as:

$$\boldsymbol{\delta m} = \frac{(1+\tau_i^m)\, p_i^{m0} M_i^{0(1-\eta_i)}}{(1+\tau_i^m) p_i^{m0} M_i^{0(1-\eta_i)} + p_i^{d0} D_i^{0(1-\eta_i)}} \qquad (86)$$

$$\boldsymbol{\delta d} = \frac{p_i^{d0} D_i^{0(1-\eta_i)}}{(1+\tau_i^m) p_i^{m0} M_i^{0(1-\eta_i)} + p_i^{d0} D_i^{0(1-\eta_i)}} \qquad (87)$$

And the scaling coefficient:

$$\boldsymbol{\gamma_i} = \frac{Q_i^0}{(\delta m_i M_i^{0\eta_i} + \delta d_i D_i^{0\eta_i})^{1/\eta_i}} \qquad (88)$$

Where σ_i are equal to the substitution elasticities and $\eta_i = (\sigma_i - 1)/\sigma_i$.

For the calibration of the CET function the share coefficients are calculated as:

$$\boldsymbol{\xi d_i} = \frac{p_i^{d0} D_i^{0(1-\varphi_i)}}{p_i^{e0} E_i^{0(1-\varphi_i)} + p_i^{d0} D_i^{0(1-\varphi_i)}} \qquad (89)$$

Moreover, when we consider exports as an endogenous variable in the tax simulations:

$$\boldsymbol{\xi e_i} = \frac{p_i^{e0} E_i^{0(1-\varphi_i)}}{p_i^{e0} E_i^{0(1-\varphi_i)} + p_i^{d0} D_i^{0(1-\varphi_i)}} \qquad (90)$$

And the scaling coefficient:

$$\boldsymbol{\theta_i} = \frac{Z_i^0}{(\xi e_i E_i^{0\varphi_i} + \xi d_i D_i^{0\varphi_i})^{1/\varphi_i}} \qquad (91)$$

Where ψ_i are transformation elasticities and $\varphi_i = (\psi_i + 1)/\psi_i$.

The elasticities of substitution between domestic production and imports are obtained exogenously from the well-known Global Trade Analysis Project (GTAP) (Hertel, 1997) and the SALTER model (Jomini *et al*., 1991), Table 40. We assume the same elasticities for substitution and transformation for tax simulations.

Table 40 – Value of the Armington elasticities of substitution and transformation

Sector Code	Activities	Value of the Armington and transformation elasticities
1	Primary sector	2.31
2	Mining and quarrying products	2.80
3	Food products and beverages	2.80
4	Textiles, furs and leather	3.29
5	Wood and products of wood and cork	2.21
6	Pulp, paper and paper products	2.21
7	Coke, refined petroleum products and nuclear fuels	2.56
8	Chemicals, rubber and plastic products	1.90
9	Other non-metallic mineral products	2.80
10	Metallurgy and other basic metals	2.80
11	Machinery and equipment	2.99
12	Motor vehicles, and other transport equipment	5.20
13	Electrical energy, gas, steam and hot water	2.80
14	Other manufactured goods	2.80
15	Construction work	1.90
16	Public administration and defence services	1.92
17	Transport and communicating services	1.90
18	Accommodation services	1.90
19	Restaurant services	1.90
20	Cultural and sport services	1.92
21	Rental services	1.92
22	Other services	1.92

This model is homogeneous of degree zero in prices. Because of Walras' law, we can only solve the model for relative prices. As usual, we have to choose one good or factor as a numeraire and fix its price at one. In our case we choose the price of labor (wage) as a numeraire of the model.

6. Simulation results

6.1. Scenarios proposed

We are going to divide the scenarios on two: impact simulations of changes in tourism consumption and simulations of taxation on tourism characteristic activities.

Impact scenarios (presented in table 41) based on a similar expansion than the one experienced in Galicia in the celebration of the Xacobeo years:

Scenario 1: A ten per cent increase in total Inbound Tourism as is assumed for the years of Xacobeo celebrations, following the BBVA research analysis on the effects of the Xacobeo 2010 (BBVA research, 2011). They established a 10.9% growth in arrivals of visitors from the rest of Spain and an increase of 15.2% in arrivals of foreign visitors.

Scenario 2: A ten per cent increase in total Inbound Tourism but only in tourism characteristic activities.

Scenario 3: A ten per cent increase in total Inbound Tourism but only in hospitality services (S18 and S19). This scenario allows us to compare the results obtained with the ones of those which identify tourism as the hospitality sector, basically.

Table 41 – Impact scenarios

	SC1	SC2	SC3
	Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
S1	8324	0	0
S2	0	0	0
S3	11492	0	0
S4	528	0	0
S5	194	0	0
S6	1652	0	0
S7	5932	0	0
S8	115	0	0
S9	229	0	0
S10	826	0	0
S11	0	0	0
S12	548	0	0
S13	3966	0	0
S14	690	0	0
S15	0	0	0
S16	0	0	0
S17	34353	34353	0
S18	31109	31109	31109
S19	62679	62679	62679
S20	6570	6570	0
S21	1593	1593	0
S22	63358	63358	0
	234158	199662	93788

Taxation scenarios:

Scenario 4: VAT rate change from eight to ten per cent in accommodation services, as was altered in the fiscal reform of 2009.

Scenario 5: VAT rate change from eight to ten per cent in restaurant services and similar establishments, as was altered in the fiscal reform of 2009.

Scenario 6: Scenarios 1 and 2 at the same time, as were changed in the fiscal reform of 2009.

Scenario 7: A hypothetical VAT rate change from eight to 21 per cent for these two products, moving them to a higher taxation bracket from a reduced type to a normal type.

6.2. Results obtained from impact simulations

Results of the impact simulations appear in Tables 42-50 in the appendix of this chapter. Table 42 shows variations in domestic and total production; Table 43 offers results regarding variations in production factors; Table 44 presents variations in prices; Table 45 reports results on variations in private consumption; Table 46-47 show variations in investment and savings; Table 48 presents results of variations in public consumption; Table 49 presents variations in imports and, finally, Table 50 offers results on variations in total production and welfare.

Production and other macroeconomic results

As stated in previous chapters, an increase in inbound tourism consumption has a positive impact on sectors related to tourism characteristic products (transport and communication services, accommodation services, restaurant services and cultural and sport services), as well as on those activities indirectly associated (food and beverage products, the primary sector and other services). For example, in the first scenario, a ten per cent increase in inbound tourism consumption mainly affects the production of accommodation services (+6.24%, +2.84% on domestic production), restaurant services (+1.53%) and transport services (+1.37%).

Nevertheless, the reallocation of resources between productive sectors, due to the savings driven closure rule used, causes other sectors (essentially associated with private investment goods and services such as construction (-2.65%) or machinery and equipment (-2.85%)) to fall when there is a decrease in the current account with the rest of the world (-7.38%). A similar result was also found in Valle (2004) and Álvarez (2010) when they simulated a decline in tourism consumption in the Balearic Islands and Spain, respectively.

Most of the remaining results are close to cero including prices, private and public consumption and total production.

Welfare effects

As productive effects were measured previously, the main goal in this chapter is to analyze the results from the point of view of household welfare. Moreover, a direct measure of economic welfare is, by definition, utility.

However, as Hosoe *et al*. (2010) note, utility has its weaknesses as a welfare estimator because it is ordinal by nature. Therefore, if a policy simulation results in higher utility to one household but lower to another, we cannot conclude that the policy has increased social welfare. We cannot compare the amount of utility for different households either. Only when no household is worse off and at least one is better off, can we conclude that social welfare has improved, from the viewpoint of Pareto efficiency.

To overcome these limitations, we use Hicksian equivalent variations of the utility of each household and percentage changes in individual utility. We can define the Hicksian equivalent variations (EV) as follows:

$$\boldsymbol{EV = ep\left(p_i^{q0}, UU_l^{*}\right) - ep(p_i^{q0}, UU_l^{0})} \qquad (92)$$

Where ep is an expenditure function that indicates the minimum expenditure level that satisfies the given utility UU under a price vector p_i^q. For comparing situations in terms of utility levels (UU_l^* and UU_l^0), we have to control for different changes in prices using the base run price vector $p_i^{q\,0}$ (which gives us the same utility level) in both expenditure functions. Therefore, we can describe the utility level problem as:

$$\boldsymbol{min\ ep_l = \sum_i p_i^q X_{i,l}^p} \qquad (93)$$

Subject to

$$\boldsymbol{\prod_i X_{i,l}^{p^{\alpha_{i,l}}} = UU_l} \qquad (94)$$

And form first-order conditions we get that:

$$\boldsymbol{ep_l = \frac{UU_l}{\prod_i (\alpha_{i,l}/p_i^q)^{\alpha_{i,l}}}} \qquad (95)$$

From here we can now calculate $ep_l{}^0$ and $ep_l{}^*$:

$$\boldsymbol{ep_l{}^0 = \frac{UU_l{}^0}{\prod_i (\alpha_{i,l}/1)^{\alpha_{i,l}}}} \qquad (96)$$

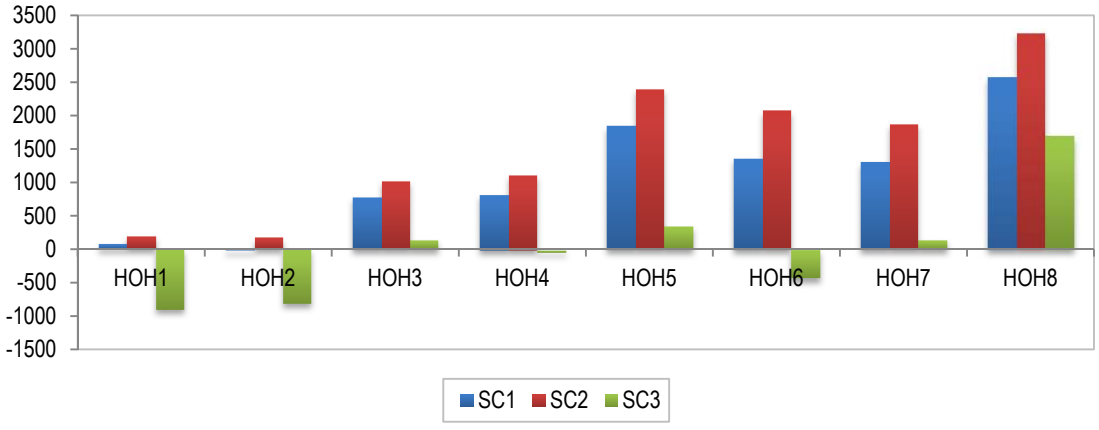
$$\boldsymbol{ep_l{}^* = \frac{UU_l{}^*}{\prod_i (\alpha_{i,l}/1)^{\alpha_{i,l}}}} \qquad (97)$$

And the welfare change indicator as:

$$\boldsymbol{EV = ep_l{}^* - ep_l{}^0} \qquad (98)$$

Once we explain how to measure welfare with our CGE model, results show that an increase in inbound tourism causes a positive impact on the welfare of the households. In terms of the Hicksian equivalent variation, inbound tourism (SC1) increases the social welfare of Galicia and also all individuals´ welfare, except for the second household. Nevertheless, considering the results in variation of the utility as well, in general all scenarios benefit high-income households more than low-income ones (Figure 16). When we try to isolate the effect of tourism characteristic products, SC2 offers the best results of all the impact simulations. However, SC3, which only reflects an expansion in accommodation and restaurant services, presents a negative impact on the welfare of four households and it is only considerably positive for the richest families.

Figure 16 - Welfare effects of impact scenarios. Hicksian equivalent variations



6.3. Results obtained from tax simulations

Results of the tourism taxation simulations are presented in Tables 51-59 in the appendix. Table 51 reports variations in domestic and total production; Table 52 shows variations in production factors; results of variations in prices appear in Table 53; Table 54 presents results on variations in private consumption; Table 55-56 offer variations in investment and savings; Table 57 presents results on variations in public consumption; Table 58 shows variations in exports and imports and, lastly, Table 59 presents variations in total production and welfare.

Production and other macroeconomic results

In this section, the economy-wide effects of increasing the value-added tax on tourism products are presented through four more scenarios. Regarding SC6, we can see the effects of the fiscal reform of 2009 (where tourism products were included in the reduced products bracket) and in SC7 we simulate the inclusion of tourism products among the normal VAT rate.

These two scenarios have strong negative effects on domestic production in accommodation (-3.32% in SC6 and -17.00% in SC7) and restaurants services (-0.99% in SC6 and -6.32% in SC7) as expected, but also some influence on those activities with important linkages with them such as food and beverages industries (-0.17% in SC6 and -0.98% in SC7) and primary sectors (-0.05% in SC6 and -0.29% in SC7).

With regards to prices results, it can be seen that these policies increase the prices of these sectors in +0.83% and +0.93%, respectively, in SC6 and +4.46% and +6.19% in SC7, but they have different effects depending on the sector (SC4 and SC5). Taxing accommodation services will charge the effect mainly onto the inbound consumption while in the case of restaurant services tax will be levied on domestic consumers, both final and intermediate ones.

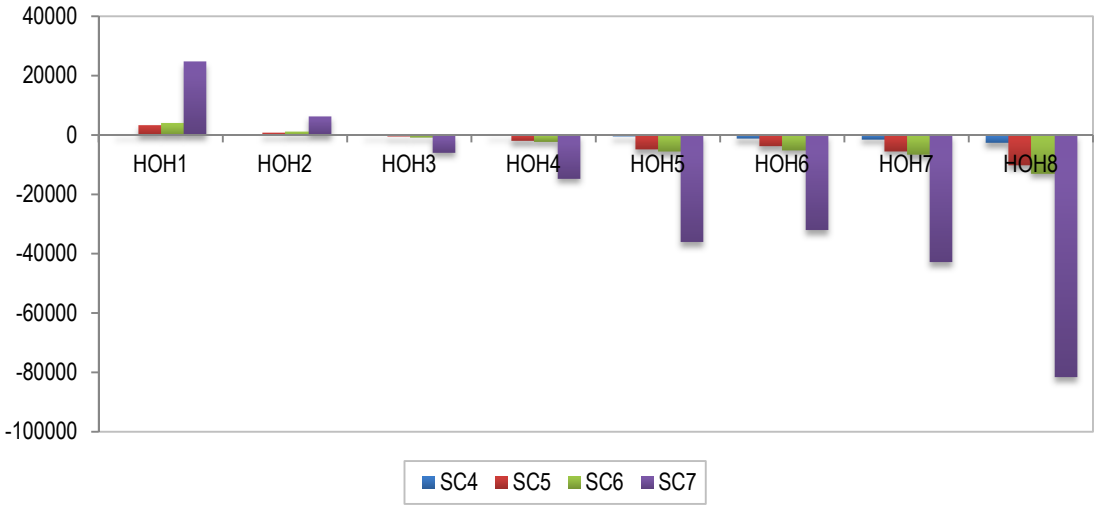
Private consumption on these two sectors would fall progressively by level of income from -0.59% and 2.92% in accommodation and -0.69% and -4.51% in restaurants (for the lowest-income household) to -0.82% and -4.26% and -0.92% and -5.82% (for the highest-income household) in SC6 and SC7, respectively. This result is related to the increase in disposable income in Table 56. It can be seen also that public consumption and savings increase with the rise of VAT on these activities, as expected.

Finally, regarding trade impact, exports of accommodation will fall drastically a -7.57% in SC6 and -35.16% in SC7. Restaurants will also fall considerably, -2.94% in SC6 and -17.69% in SC7. On the other hand, imports of these activities will increase +1.13% and +0.99% in SC6 and +6.24% and +6.62% in SC7, which means a rise of the outbound tourism of Galicia.

Welfare effects

Table 59 shows results regarding welfare. As can be observed, these policies would make the poorest households better off, but the middle- and high-income households would be worse off (Figure 17). Therefore, increasing the VAT of tourism products would decrease inequality in terms of disposable income, but also social welfare in general. Distinguishing between policies, the increase in restaurants has more noticeable results than the same increase in accommodation since its relation with the domestic economy is higher.

Figure 17 - Welfare effects of taxation scenarios. Hicksian equivalent variations



7. Summary and conclusions

This chapter presented a first attempt of a CGE analysis of the macroeconomic and welfare effects of an expansion in tourism consumption and an increase on VAT rates in tourism products for Galicia. This framework allows us to estimate possible changes in utility, and we continue taking into account the full circular flow of income of the economy.

The design, formulation and calibration of the Galician CGE model proposed, was shown in the first part of this chapter. This model is a static regional model with the particularity of presenting two governments (central and regional) and eight households, and is calibrated with the 2008 Galician SAM, offered in the second chapter.

After we selected the closure rule followed and the external information used for the calibration, in the second part of the chapter, results of three impact scenario and four tourism taxation simulations were presented.

As can be expected from the results of the previous chapters, an expansion in inbound tourism consumption would have a positive impact on tourism characteristic activities (transport and communication services, accommodation services, restaurant services and cultural and sport services), and also on those sectors indirectly associated (food products and beverages, the primary sector and other services). These results are similar to the ones obtained in other impact studies such as Zhou *et al.* (1997) or Blake (2000). However, as we have seen, the savings driven closure rule used causes other sectors associated with private investment to fall when there is a decrease in the current account with the rest of the world, as was also found in Valle (2004) and Álvarez (2010), when they simulate a fall in tourism consumption in the Balearic Islands and Spain, respectively.

Focusing on welfare effects, in terms of Hicksian equivalent variation, inbound tourism (SC1) increases the social welfare of Galicia. Nevertheless, considering the results in variation of utility as well, in general all the scenarios benefit high-income households more so than low-income ones.

By implementing the tourism tax simulations proposed, this closure rule selected seems to work better than for the demand impact studies. In this case, the impact on these two sectors would be negative. Another interesting result is that, as prices of these activities grow, visiting other regions or countries is relatively cheaper also for the Galician population, so there is a significant increase in imports.

In terms of welfare, these policies would increase the utility of low-income households, but the middle and high-income households would be worse off. Therefore, increasing the VAT of tourism products would decrease inequality in terms of disposable income, but also social welfare in general.

As can be observed through these results, different policies have different effects on international tourists, domestic residents and productive sectors within the economy. We can conclude from the results obtained that taxing accommodation services will charge the effect principally on the inbound consumers (relocating income from non-resident visitors to resident households through the governments) while, in the case of restaurant services, the tax would be levied on the domestic consumers, both final and intermediate ones.

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Appendix

Mathematical notation used in chapter 4

Sets

i, j productive sectors

h, k production factors

l households

r governments

Production

Y_j value-added composite factor

$F_{h,j}$ the h-th factor input by the j-th firm

$X_{i,j}$ intermediate input

Z_j output of the j-th good

E_i exports

M_i imports

Q_i Armington's composite good

D_i domestic good

p_h^f the h-th factor price

p_j^y composite factor price

p_j^z supply price of the i-th good

p_i^q Armington's composite good price

p_i^e export price in local currency

p_i^m import price in local currency

p_i^d the i-th domestic good price

$\beta_{h,j}$ share parameter in production function

b_j scale parameter in production function

$ax_{i,j}$ intermediate input requirement coefficient

ay_j composite fact. input req. coefficient

Households

$X_{i,l}^p$ household consumption of the i-th good

$FF_{l,h}$ factor endowment of the h-th factor

S_l^p private saving

UU_l utility [fictitious]

$\alpha_{i,l}$ share parameter in utility function

sp_l^p average propensity for private saving

NDI_l net disposable income of the households

Governments

$X_{i,r}^g$ governments consumption

sp_r^g average propensity for government saving

$\mu_{i,r}$ government consumption share

NDI_r net disposable income of the governments

$\tau_l{}^d$ income tax rate

τ^{cp} corporation tax rate

$\tau_i{}^{vat}$ net value tax rate

$\tau_i{}^{et}$ excise tax rate

$\tau_i{}^{otp}$ other production tax rate

$\tau_i{}^{ssc}$ social security contribution rate

$\tau_i{}^m$ import tariff rate

T_l^d income taxes

T_j^{vat} net value added tax

T_j^{et} excise tax

T_j^{otp} other production taxes

T_j^m import tariff

T_j^{ssc} social security contributions

T^{cp} corporation tax

S_r^g government savings

RT_r^d revenues from income taxes

RT_r^{vat} revenues from value-added tax

RT_r^{et} revenues from excise taxes

RT_r^{otp} revenues from other taxes on production

RT_r^{ssc} revenues from social security contributions

RT_r^{cp} revenues from corporation taxes

RT_r^m revenues from tariffs

$TRD_{l,r}$ transfers from government to households

$Td_{r,l}$ transfers from households to governments

$TRrg_{r}$ transfers from governments to governments

$TRpcp_{r}$ transfers from government to corporations

$TRrcp_{r}$ transfers from corporations to governments

$Thhcrp_{l}$ transfers from households to corporations

$TRcrphh_{l}$ transfers from corporations to households

ς_{r}^{rd} transfers from government to households rate

ς_{l}^{dt} transfers from households to governments rate

ς_{r}^{govt} transfers from governments to governments rate

ς_{r}^{gct} transfers from government to corporations rate

ς^{cgt} transfers from corporations to governments rate

ς_{l}^{hht} transfers from households to corporations rate

ς^{cpt} transfers from corporations to households rate

Corporations

FF^{cp} corporation revenues from capital

S^{cp} corporation savings

sf^{cp} share of capital revenues for corporations

sp^{cp} average propensity for corporation savings

Investment-savings

X_{i}^{v} investment demand

λ_{i} investment demand share

Foreign sector

p_i^{We} export price

p_i^{Wm} import price

S^f foreign savings

σ_i elasticity of substitution

ψ_i elasticity of transformation

η_i substitution elasticity parameter

φ_i transformation elasticity parameter

ε exchange rate

δ_i^m share par. in Armington function

δ_i^d share par. in Armington function

γ_i scale par. in Armington function

ξ_i^d share par. in transformation function

ξ_i^e share par. in transformation function

θ_i scale par. in transformation function

Table 42 – Impact simulations. Results for variations in production (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Total production	S1	0.5255	0.2542	0.1329
	S2	0.7162	0.5778	0.2424
	S3	0.4525	0.2760	0.1824
	S4	0.1858	0.1639	0.0647
	S5	-0.0792	-0.0855	-0.0429
	S6	0.4949	0.2330	0.0731
	S7	0.3730	0.1781	0.0226
	S8	0.1839	0.1691	0.0568
	S9	-0.7380	-0.6597	-0.3084
	S10	0.0390	0.0185	0.0066
	S11	-0.1895	-0.1507	-0.0900
	S12	0.0094	0.0050	0.0011
	S13	0.2377	0.1272	0.0458
	S14	0.0830	0.0683	0.0148
	S15	-2.2262	-1.9751	-0.9298
	S16	-0.0003	-0.0162	0.0085
	S17	1.3744	1.3562	0.0276
	S18	6.2354	6.2279	6.1375
	S19	1.5315	1.5364	1.4838
	S20	0.3504	0.3575	0.0142
	S21	0.5503	0.5709	-0.0421
	S22	0.4495	0.4609	-0.0335
Domestic production	S1	0.4892	0.3469	0.1814
	S2	0.8726	0.7040	0.2953
	S3	0.5979	0.4899	0.3238
	S4	0.4189	0.3990	0.1576
	S5	-0.2291	-0.2124	-0.1066
	S6	0.5381	0.3945	0.1238
	S7	0.3884	0.3041	0.0387
	S8	0.2732	0.2558	0.0859
	S9	-1.1101	-0.9784	-0.4573
	S10	0.0565	0.0433	0.0155
	S11	-0.3479	-0.2767	-0.1651
	S12	0.0303	0.0361	0.0078
	S13	0.1994	0.1611	0.0580
	S14	0.0688	0.0749	0.0162
	S15	-2.2262	-1.9751	-0.9298
	S16	-0.0003	-0.0162	0.0085
	S17	0.7695	0.7440	0.0384
	S18	2.8458	2.8314	2.6580
	S19	0.5448	0.5504	0.4914
	S20	0.2182	0.2256	0.0150
	S21	0.2015	0.2243	-0.0464
	S22	0.1099	0.1220	-0.0356

Table 43 – Impact simulations. Results for variations in production factors (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Production factors	S1	0.5548	0.2896	0.1310
CAP	S2	0.8102	0.6917	0.2363
	S3	0.5101	0.3459	0.1787
	S4	0.2320	0.2199	0.0617
	S5	0.0225	0.0379	-0.0495
	S6	0.5730	0.3275	0.0681
	S7	0.3924	0.2016	0.0214
	S8	0.2129	0.2043	0.0549
	S9	-0.6530	-0.5565	-0.3140
	S10	0.1387	0.1394	0.0001
	S11	-0.1542	-0.1079	-0.0923
	S12	0.0996	0.1144	-0.0048
	S13	0.2823	0.1813	0.0429
	S14	0.1579	0.1592	0.0099
	S15	-2.1384	-1.8684	-0.9355
	S16	0.2100	0.2389	-0.0052
	S17	1.5270	1.5413	0.0178
	S18	6.3657	6.3859	6.1290
	S19	1.6176	1.6409	1.4782
	S20	0.4312	0.4555	0.0090
	S21	0.6516	0.6939	-0.0486
	S22	0.6624	0.7193	-0.0472
Production factors	S1	0.3322	0.0204	0.1454
LAB	S2	0.5871	0.4213	0.2507
	S3	0.2877	0.0764	0.1931
	S4	0.0102	-0.0492	0.0761
	S5	-0.1989	-0.2307	-0.0351
	S6	0.3504	0.0581	0.0825
	S7	0.1702	-0.0674	0.0358
	S8	-0.0089	-0.0647	0.0693
	S9	-0.8729	-0.8235	-0.2996
	S10	-0.0830	-0.1294	0.0145
	S11	-0.3752	-0.3761	-0.0779
	S12	-0.1220	-0.1544	0.0096
	S13	0.0604	-0.0876	0.0573
	S14	-0.0638	-0.1097	0.0243
	S15	-2.3550	-2.1319	-0.9213
	S16	-0.0119	-0.0303	0.0092
	S17	1.3023	1.2686	0.0322
	S18	6.1302	6.1003	6.1443
	S19	1.3927	1.3680	1.4928
	S20	0.2089	0.1858	0.0234
	S21	0.4289	0.4235	-0.0342
	S22	0.4396	0.4489	-0.0328

Table 44 – Impact simulations. Results for variations in prices (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Production prices	S1	-0.0359	-0.0335	0.1018
	S2	0.2196	0.1668	0.1781
	S3	0.1051	0.0844	0.1577
	S4	0.1621	0.1135	0.1560
	S5	0.0273	-0.0024	0.0987
	S6	0.1185	0.1032	0.1456
	S7	0.1786	0.1542	0.1667
	S8	0.1372	0.0883	0.1467
	S9	-0.0116	-0.0402	0.0853
	S10	0.1867	0.1395	0.1658
	S11	0.1416	0.0946	0.1472
	S12	0.2184	0.1673	0.1787
	S13	-0.0350	-0.0412	0.0886
	S14	0.0283	-0.0057	0.0964
	S15	-0.0697	-0.1002	0.0487
	S16	-0.0221	-0.0316	0.0223
	S17	-0.1604	-0.1973	0.1159
	S18	-0.4937	-0.5373	-0.5092
	S19	-0.4929	-0.5204	-0.3953
	S20	-0.1252	-0.1579	0.0589
	S21	-0.0668	-0.1043	0.1014
	S22	-0.1435	-0.1655	0.0658
Domestic prices	S1	-0.1305	-0.1098	0.0714
	S2	-0.0155	-0.0556	0.0694
	S3	0.0033	0.0052	0.1321
	S4	0.0303	-0.0096	0.1010
	S5	-0.0981	-0.1142	0.0457
	S6	-0.0328	-0.0055	0.0908
	S7	0.1260	0.1216	0.1473
	S8	-0.0267	-0.0673	0.0798
	S9	-0.1744	-0.1872	0.0184
	S10	0.0445	0.0123	0.1055
	S11	-0.1101	-0.1400	0.0416
	S12	0.1015	0.0612	0.1277
	S13	-0.0376	-0.0434	0.0876
	S14	-0.0645	-0.0902	0.0561
	S15	-0.0697	-0.1002	0.0487
	S16	-0.0221	-0.0316	0.0223
	S17	-0.3635	-0.3918	0.0767
	S18	-1.7569	-1.7819	-1.6950
	S19	-0.5563	-0.5815	-0.4452
	S20	-0.1776	-0.2072	0.0401
	S21	-0.2719	-0.2985	0.0414
	S22	-0.2253	-0.2407	0.0392
Exchange rate		0.2587	0.2038	0.1962
Factor prices	CAP	-0.2213	-0.2685	0.0144
	LAB	numeraire	numeraire	numeraire

Table 45 – Impact simulations. Results for variations in private consumption (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Private Consumption	S1	-0.0097	-0.0308	-0.0787
HOH1	S2	-0.2646	-0.2307	-0.1548
	S3	-0.1506	-0.1486	-0.1344
	S4	-0.2074	-0.1776	-0.1327
	S5	-0.0729	-0.0619	-0.0755
	S6	-0.1640	-0.1673	-0.1223
	S7	-0.2238	-0.2181	-0.1433
	S8	-0.1825	-0.1525	-0.1234
	S9	-0.0341	-0.0241	-0.0622
	S10	-0.2320	-0.2035	-0.1425
	S11	-0.1870	-0.1588	-0.1239
	S12	-0.2635	-0.2312	-0.1553
	S13	-0.0107	-0.0231	-0.0655
	S14	-0.0739	-0.0586	-0.0732
	S15	0.0241	0.0359	-0.0256
	S16	-0.0236	-0.0328	0.0008
	S17	0.1149	0.1333	-0.0927
	S18	0.4502	0.4755	0.5350
	S19	0.4495	0.4585	0.4200
	S20	0.0796	0.0937	-0.0358
	S21	0.0211	0.0400	-0.0782
	S22	0.0980	0.1014	-0.0427
Private Consumption	S1	-0.0317	-0.0541	-0.0849
HOH2	S2	-0.2866	-0.2540	-0.1610
	S3	-0.1726	-0.1719	-0.1406
	S4	-0.2294	-0.2009	-0.1389
	S5	-0.0949	-0.0853	-0.0817
	S6	-0.1860	-0.1906	-0.1285
	S7	-0.2458	-0.2414	-0.1496
	S8	-0.2045	-0.1758	-0.1296
	S9	-0.0561	-0.0474	-0.0684
	S10	-0.2539	-0.2268	-0.1487
	S11	-0.2090	-0.1821	-0.1302
	S12	-0.2855	-0.2545	-0.1615
	S13	-0.0327	-0.0465	-0.0717
	S14	-0.0959	-0.0819	-0.0795
	S15	0.0020	0.0126	-0.0318
	S16	-0.0456	-0.0561	-0.0054
	S17	0.0929	0.1099	-0.0989
	S18	0.4281	0.4521	0.5287
	S19	0.4274	0.4350	0.4137
	S20	0.0576	0.0703	-0.0420
	S21	-0.0009	0.0167	-0.0844
	S22	0.0759	0.0780	-0.0489

Private Consumption	S1	-0.0248	-0.0452	-0.0864
HOH3	S2	-0.2796	-0.2451	-0.1625
	S3	-0.1656	-0.1630	-0.1421
	S4	-0.2224	-0.1920	-0.1404
	S5	-0.0880	-0.0763	-0.0832
	S6	-0.1790	-0.1817	-0.1300
	S7	-0.2388	-0.2325	-0.1510
	S8	-0.1976	-0.1669	-0.1311
	S9	-0.0491	-0.0385	-0.0699
	S10	-0.2470	-0.2179	-0.1502
	S11	-0.2020	-0.1732	-0.1316
	S12	-0.2785	-0.2456	-0.1630
	S13	-0.0257	-0.0375	-0.0732
	S14	-0.0890	-0.0730	-0.0809
	S15	0.0090	0.0215	-0.0333
	S16	-0.0386	-0.0472	-0.0069
	S17	0.0998	0.1189	-0.1004
	S18	0.4351	0.4611	0.5272
	S19	0.4344	0.4440	0.4123
	S20	0.0646	0.0793	-0.0435
	S21	0.0061	0.0256	-0.0859
	S22	0.0829	0.0870	-0.0504
Private Consumption	S1	-0.0316	-0.0519	-0.0895
HOH4	S2	-0.2864	-0.2517	-0.1656
	S3	-0.1724	-0.1696	-0.1452
	S4	-0.2292	-0.1987	-0.1435
	S5	-0.0948	-0.0830	-0.0863
	S6	-0.1858	-0.1884	-0.1331
	S7	-0.2456	-0.2392	-0.1541
	S8	-0.2044	-0.1736	-0.1342
	S9	-0.0559	-0.0452	-0.0730
	S10	-0.2538	-0.2246	-0.1532
	S11	-0.2088	-0.1798	-0.1347
	S12	-0.2853	-0.2522	-0.1661
	S13	-0.0325	-0.0442	-0.0763
	S14	-0.0958	-0.0796	-0.0840
	S15	0.0022	0.0148	-0.0364
	S16	-0.0454	-0.0538	-0.0100
	S17	0.0930	0.1122	-0.1035
	S18	0.4283	0.4543	0.5241
	S19	0.4275	0.4373	0.4092
	S20	0.0578	0.0726	-0.0466
	S21	-0.0007	0.0189	-0.0890
	S22	0.0761	0.0803	-0.0535

Private Consumption	S1	-0.0269	-0.0454	-0.0916
HOH5	S2	-0.2818	-0.2453	-0.1677
	S3	-0.1677	-0.1632	-0.1473
	S4	-0.2245	-0.1922	-0.1456
	S5	-0.0901	-0.0765	-0.0884
	S6	-0.1811	-0.1819	-0.1352
	S7	-0.2410	-0.2327	-0.1562
	S8	-0.1997	-0.1671	-0.1363
	S9	-0.0512	-0.0387	-0.0751
	S10	-0.2491	-0.2181	-0.1553
	S11	-0.2041	-0.1734	-0.1368
	S12	-0.2806	-0.2458	-0.1682
	S13	-0.0278	-0.0377	-0.0784
	S14	-0.0911	-0.0732	-0.0861
	S15	0.0069	0.0213	-0.0384
	S16	-0.0407	-0.0473	-0.0121
	S17	0.0977	0.1187	-0.1055
	S18	0.4330	0.4609	0.5220
	S19	0.4322	0.4438	0.4071
	S20	0.0624	0.0791	-0.0487
	S21	0.0040	0.0254	-0.0911
	S22	0.0808	0.0868	-0.0556
Private Consumption	S1	-0.0218	-0.0390	-0.0926
HOH6	S2	-0.2767	-0.2389	-0.1687
	S3	-0.1627	-0.1568	-0.1483
	S4	-0.2195	-0.1858	-0.1466
	S5	-0.0851	-0.0701	-0.0894
	S6	-0.1761	-0.1755	-0.1362
	S7	-0.2359	-0.2263	-0.1572
	S8	-0.1947	-0.1607	-0.1373
	S9	-0.0462	-0.0323	-0.0761
	S10	-0.2441	-0.2117	-0.1563
	S11	-0.1991	-0.1670	-0.1378
	S12	-0.2756	-0.2394	-0.1692
	S13	-0.0228	-0.0313	-0.0794
	S14	-0.0861	-0.0668	-0.0871
	S15	0.0119	0.0277	-0.0395
	S16	-0.0357	-0.0410	-0.0131
	S17	0.1028	0.1251	-0.1066
	S18	0.4380	0.4673	0.5210
	S19	0.4373	0.4502	0.4060
	S20	0.0675	0.0855	-0.0497
	S21	0.0090	0.0318	-0.0921
	S22	0.0858	0.0932	-0.0566

Private Consumption	S1	-0.0363	-0.0560	-0.0928
HOH7	S2	-0.2912	-0.2559	-0.1689
	S3	-0.1772	-0.1738	-0.1485
	S4	-0.2340	-0.2028	-0.1468
	S5	-0.0995	-0.0872	-0.0897
	S6	-0.1905	-0.1925	-0.1365
	S7	-0.2504	-0.2433	-0.1575
	S8	-0.2091	-0.1777	-0.1376
	S9	-0.0607	-0.0493	-0.0764
	S10	-0.2585	-0.2287	-0.1566
	S11	-0.2135	-0.1840	-0.1381
	S12	-0.2900	-0.2564	-0.1695
	S13	-0.0373	-0.0484	-0.0796
	S14	-0.1005	-0.0838	-0.0874
	S15	-0.0026	0.0107	-0.0397
	S16	-0.0502	-0.0580	-0.0134
	S17	0.0883	0.1080	-0.1068
	S18	0.4235	0.4502	0.5207
	S19	0.4227	0.4331	0.4058
	S20	0.0530	0.0684	-0.0499
	S21	-0.0055	0.0148	-0.0924
	S22	0.0713	0.0761	-0.0569
Private Consumption	S1	-0.0442	-0.0650	-0.0937
HOH8	S2	-0.2991	-0.2649	-0.1698
	S3	-0.1851	-0.1828	-0.1494
	S4	-0.2419	-0.2118	-0.1477
	S5	-0.1075	-0.0962	-0.0906
	S6	-0.1985	-0.2015	-0.1373
	S7	-0.2583	-0.2523	-0.1584
	S8	-0.2170	-0.1867	-0.1385
	S9	-0.0686	-0.0583	-0.0773
	S10	-0.2664	-0.2377	-0.1575
	S11	-0.2215	-0.1930	-0.1390
	S12	-0.2980	-0.2653	-0.1703
	S13	-0.0452	-0.0574	-0.0805
	S14	-0.1084	-0.0928	-0.0883
	S15	-0.0105	0.0017	-0.0406
	S16	-0.0581	-0.0670	-0.0143
	S17	0.0803	0.0990	-0.1077
	S18	0.4155	0.4411	0.5198
	S19	0.4148	0.4241	0.4049
	S20	0.0450	0.0594	-0.0508
	S21	-0.0134	0.0058	-0.0932
	S22	0.0634	0.0671	-0.0577

Table 46 – Impact simulations. Results for variations in investment (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Investment	S1	-2.6841	-2.4221	-1.1420
	S2	-2.9322	-2.6172	-1.2173
	S3	-2.8213	-2.5370	-1.1971
	S4	-2.8765	-2.5654	-1.1954
	S5	-2.7457	-2.4525	-1.1388
	S6	-2.8343	-2.5553	-1.1851
	S7	-2.8925	-2.6049	-1.2059
	S8	-2.8523	-2.5409	-1.1862
	S9	-2.7078	-2.4155	-1.1257
	S10	-2.9004	-2.5906	-1.2051
	S11	-2.8566	-2.5470	-1.1868
	S12	-2.9311	-2.6176	-1.2178
	S13	-	-	-
	S14	-2.7466	-2.4491	-1.1366
	S15	-2.6513	-2.3569	-1.0894
	S16	-	-	-
	S17	-	-	-
	S18	-	-	-
	S19	-	-	-
	S20	-2.5972	-2.3005	-1.0995
	S21	-	-	-
	S22	-2.5794	-2.2930	-1.1064

Table 47 – Impact simulations. Results for variations in savings and disposable income of the households (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Foreign savings		-7.3790	-6.5000	-3.112
Central Gov. savings		-0.0427	-0.0594	0.0210
Regional Gov. savings		-0.0002	-0.0317	0.0400
Disposable income	HOH1	-0.0456	-0.0643	0.0231
	HOH2	-0.0677	-0.0876	0.0168
	HOH3	-0.0607	-0.0787	0.0154
	HOH4	-0.0675	-0.0854	0.0123
	HOH5	-0.0628	-0.0789	0.0102
	HOH6	-0.0578	-0.0725	0.0092
	HOH7	-0.0723	-0.0895	0.0089
	HOH8	-0.0802	-0.0985	0.0080

Table 48 – Impact simulations. Results for variations in public consumption (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Central Gov. (Public consumption)	S1	-	-	-
	S2	-	-	-
	S3	-	-	-
	S4	-	-	-
	S5	-	-	-
	S6	-	-	-
	S7	-	-	-
	S8	-	-	-
	S9	-	-	-
	S10	-	-	-
	S11	-	-	-
	S12	-	-	-
	S13	-	-	-
	S14	-0.0981	-0.0816	-0.0858
	S15	-	-	-
	S16	-0.0478	-0.0557	-0.0118
	S17	-	-	-
	S18	-	-	-
	S19	-	-	-
	S20	0.0554	0.0707	-0.0484
	S21	-	-	-
	S22	0.0737	0.0783	-0.0553
Regional Gov. (Public consumption)	S1	-	-	-
	S2	-	-	-
	S3	-	-	-
	S4	-	-	-
	S5	-	-	-
	S6	-	-	-
	S7	-	-	-
	S8	-0.1371	-0.1200	-0.1066
	S9	-	-	-
	S10	-	-	-
	S11	-	-	-
	S12	-0.2181	-0.1987	-0.1385
	S13	-	-	-
	S14	-0.0285	-0.0260	-0.0564
	S15	-	-	-
	S16	0.0219	-0.0002	0.0177
	S17	0.1605	0.1659	-0.0758
	S18	-	-	-
	S19	0.4952	0.4912	0.4369
	S20	0.1252	0.1263	-0.0189
	S21	-	-	-
	S22	0.1435	0.1340	-0.0258

Table 49 – Impact simulations. Results for variations in imports (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Imports	S1	-0.4096	-0.3769	-0.1065
	S2	0.1023	-0.0240	-0.0596
	S3	-0.1178	-0.0666	0.1442
	S4	-0.3317	-0.3027	-0.1551
	S5	-1.0121	-0.9107	-0.4379
	S6	-0.1067	-0.0682	-0.1087
	S7	0.0488	0.0938	-0.0863
	S8	-0.2683	-0.2589	-0.1348
	S9	-2.3014	-2.0565	-0.9512
	S10	-0.5408	-0.4909	-0.2376
	S11	-1.4398	-1.2961	-0.6250
	S12	-0.7823	-0.7015	-0.3470
	S13	-0.6275	-0.5291	-0.2452
	S14	-0.8319	-0.7449	-0.3749
	S15	-	-	-
	S16	-	-	-
	S17	-0.4153	-0.3906	-0.1881
	S18	-1.0471	-1.0058	-0.9922
	S19	-1.0023	-0.9414	-0.7273
	S20	-0.6174	-0.5622	-0.2839
	S21	-0.8141	-0.7381	-0.3427
	S22	-0.8159	-0.7289	-0.3361

Table 50 – Impact simulations. Results for variations in total production and welfare (in percentages)

		SC1	SC2	SC3
		Δ 10% increase in Total Inbound Tourism	**Δ 10% increase in Tourism characteristic products**	**Δ 10% increase in Hospitality**
Total production		-0.0540	-0.0499	-0.0326
Hicksian equivalent variation	HOH1	72.4317	190.2948	-896.3453
	HOH2	-22.6540	166.7460	-799.0866
	HOH3	785.1921	1020.8990	143.5406
	HOH4	818.7836	1103.2358	-31.7727
	HOH5	1849.2840	2393.5715	349.0259
	HOH6	1360.6039	2066.1521	-422.7075
	HOH7	1303.6623	1867.2710	141.3749
	HOH8	2588.3325	3244.2978	1698.4228
Change in utility	HOH1	0.0033	0.0087	-0.0410
	HOH2	-0.0007	0.0052	-0.0248
	HOH3	0.0296	0.0385	0.0054
	HOH4	0.0268	0.0361	-0.0010
	HOH5	0.0361	0.0467	0.0068
	HOH6	0.0244	0.0370	-0.0076
	HOH7	0.0241	0.0345	0.0026
	HOH8	0.0368	0.0461	0.0241

Table 51 – Tax simulations. Results for variations in production (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Total production	S1	-0.0221	-0.0073	-0.0294	-0.1407
	S2	0.0565	0.0559	0.1124	0.6226
	S3	-0.0300	-0.0981	-0.1282	-0.7478
	S4	0.0547	0.3466	0.4016	2.5042
	S5	0.0875	-0.0044	0.0831	0.4106
	S6	0.0325	0.0598	0.0923	0.5367
	S7	0.0140	0.0608	0.0748	0.4460
	S8	0.0709	0.1963	0.2673	1.5699
	S9	0.0286	-0.0431	-0.0146	-0.1355
	S10	0.2322	0.0832	0.3154	1.6007
	S11	0.0568	0.1328	0.1897	1.0991
	S12	0.4328	0.2056	0.6386	3.2730
	S13	0.0258	0.0525	0.0783	0.4409
	S14	0.0624	0.0669	0.1293	0.7058
	S15	0.0025	-0.0579	-0.0554	-0.3528
	S16	0.0369	0.2355	0.2724	1.6550
	S17	0.0537	0.0198	0.0735	0.3740
	S18	-5.3274	0.0232	-5.3040	-25.2349
	S19	0.0035	-1.1949	-1.1914	-7.4461
	S20	-0.0044	0.0715	0.0670	0.4224
	S21	0.0193	0.0095	0.0288	0.1407
	S22	-0.0056	0.0131	0.0076	0.0472
Domestic production	S1	-0.0240	-0.0287	-0.0528	-0.2863
	S2	0.0527	0.0555	0.1081	0.6002
	S3	-0.0363	-0.1293	-0.1657	-0.9756
	S4	0.0392	0.2561	0.2954	1.8349
	S5	0.0653	-0.0154	0.0498	0.2260
	S6	0.0261	0.0474	0.0734	0.4250
	S7	0.0125	0.0508	0.0633	0.3753
	S8	0.0700	0.1766	0.2466	1.4390
	S9	0.0231	-0.0450	-0.0219	-0.1744
	S10	0.2187	0.0861	0.3047	1.5518
	S11	0.0561	0.0885	0.1446	0.8140
	S12	0.3413	0.1643	0.5057	2.5916
	S13	0.0262	0.0468	0.0730	0.4078
	S14	0.0614	0.0652	0.1266	0.6898
	S15	0.0025	-0.0579	-0.0554	-0.3528
	S16	0.0369	0.2355	0.2724	1.6550
	S17	0.0484	0.0336	0.0820	0.4351
	S18	-3.3577	0.0383	-3.3201	-17.0036
	S19	0.0024	-0.9957	-0.9933	-6.3190
	S20	-0.0047	0.0718	0.0671	0.4235
	S21	0.0190	0.0116	0.0306	0.1532
	S22	-0.0056	0.0173	0.0117	0.0736

Table 52 – Tax simulations. Results for variations in production factors (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Production factors	S1	-0.0250	0.0067	-0.0184	-0.0681
CAP	S2	0.0471	0.1006	0.1476	0.8568
	S3	-0.0358	-0.0707	-0.1066	-0.6057
	S4	0.0501	0.3688	0.4190	2.6221
	S5	0.0772	0.0444	0.1215	0.6657
	S6	0.0247	0.0970	0.1216	0.7315
	S7	0.0121	0.0701	0.0821	0.4944
	S8	0.0680	0.2102	0.2782	1.6432
	S9	0.0199	-0.0022	0.0177	0.0778
	S10	0.2221	0.1309	0.3531	1.8534
	S11	0.0532	0.1498	0.2030	1.1883
	S12	0.4236	0.2489	0.6728	3.5053
	S13	0.0213	0.0739	0.0952	0.5525
	S14	0.0548	0.1028	0.1576	0.8940
	S15	-0.0066	-0.0150	-0.0216	-0.1296
	S16	0.0156	0.3363	0.3518	2.1888
	S17	0.0385	0.0918	0.1303	0.7512
	S18	-5.3392	0.0819	-5.2602	-25.0061
	S19	-0.0051	-1.1548	-1.1598	-7.2503
	S20	-0.0126	0.1100	0.0974	0.6241
	S21	0.0090	0.0578	0.0668	0.3925
	S22	-0.0270	0.1145	0.0875	0.5769
Production factors	S1	-0.0026	-0.0993	-0.1020	-0.6189
LAB	S2	0.0695	-0.0056	0.0639	0.3010
	S3	-0.0133	-0.1766	-0.1900	-1.1535
	S4	0.0725	0.2624	0.3351	2.0565
	S5	0.0997	-0.0617	0.0379	0.1109
	S6	0.0471	-0.0092	0.0379	0.1764
	S7	0.0346	-0.0360	-0.0015	-0.0594
	S8	0.0904	0.1040	0.1944	1.0830
	S9	0.0424	-0.1082	-0.0659	-0.4737
	S10	0.2446	0.0248	0.2693	1.2921
	S11	0.0757	0.0436	0.1193	0.6306
	S12	0.4462	0.1426	0.5887	2.9349
	S13	0.0437	-0.0322	0.0115	-0.0016
	S14	0.0773	-0.0033	0.0739	0.3379
	S15	0.0159	-0.1210	-0.1052	-0.6800
	S16	0.0380	0.2299	0.2680	1.6256
	S17	0.0610	-0.0143	0.0466	0.1959
	S18	-5.3179	-0.0242	-5.3394	-25.4194
	S19	0.0174	-1.2595	-1.2424	-7.7615
	S20	0.0099	0.0039	0.0138	0.0695
	S21	0.0315	-0.0483	-0.0168	-0.1607
	S22	-0.0045	0.0084	0.0039	0.0226

Table 53 – Tax simulations. Results for variations in prices (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Production prices	S1	0.0195	-0.0845	-0.0651	-0.4315
	S2	0.0207	-0.0584	-0.0377	-0.2602
	S3	0.0187	-0.0736	-0.0549	-0.3662
	S4	0.0184	-0.0779	-0.0595	-0.3959
	S5	0.0109	-0.0637	-0.0528	-0.3438
	S6	0.0184	-0.0649	-0.0465	-0.3126
	S7	0.0210	-0.0640	-0.0431	-0.2938
	S8	0.0212	-0.0713	-0.0501	-0.3386
	S9	0.0181	-0.0596	-0.0415	-0.2804
	S10	0.0190	-0.0577	-0.0387	-0.2639
	S11	0.0217	-0.0686	-0.0469	-0.3193
	S12	0.0166	-0.0606	-0.0440	-0.2916
	S13	0.0225	-0.0680	-0.0455	-0.3091
	S14	0.0190	-0.0633	-0.0443	-0.2992
	S15	0.0166	-0.0589	-0.0423	-0.2839
	S16	0.0074	-0.0122	-0.0048	-0.0357
	S17	0.0151	-0.0409	-0.0258	-0.1773
	S18	0.8871	-0.0520	0.8343	4.4586
	S19	0.0168	0.9149	0.9318	6.1925
	S20	0.0191	-0.0551	-0.0360	-0.2447
	S21	0.0209	-0.0512	-0.0303	-0.2116
	S22	0.0216	-0.0283	-0.0067	-0.0621
Domestic prices	S1	0.0187	-0.0930	-0.0743	-0.4887
	S2	0.0141	-0.0591	-0.0449	-0.2980
	S3	0.0166	-0.0838	-0.0672	-0.4408
	S4	0.0138	-0.1048	-0.0910	-0.5893
	S5	0.0050	-0.0667	-0.0617	-0.3927
	S6	0.0147	-0.0720	-0.0573	-0.3761
	S7	0.0204	-0.0678	-0.0474	-0.3200
	S8	0.0204	-0.0889	-0.0685	-0.4530
	S9	0.0159	-0.0603	-0.0445	-0.2965
	S10	0.0134	-0.0565	-0.0431	-0.2838
	S11	0.0213	-0.0908	-0.0695	-0.4602
	S12	0.0015	-0.0675	-0.0660	-0.4013
	S13	0.0225	-0.0680	-0.0456	-0.3096
	S14	0.0178	-0.0653	-0.0475	-0.3175
	S15	0.0166	-0.0589	-0.0423	-0.2839
	S16	0.0074	-0.0122	-0.0048	-0.0357
	S17	0.0118	-0.0325	-0.0207	-0.1399
	S18	2.4017	-0.0413	2.3589	13.5859
	S19	0.0163	0.9984	1.0149	6.7768
	S20	0.0187	-0.0546	-0.0359	-0.2434
	S21	0.0202	-0.0466	-0.0264	-0.1849
	S22	0.0216	-0.0222	-0.0006	-0.0228
Exchange rate		0.0218	-0.0583	-0.0365	-0.2539
Factor prices	CAP	0.0225	-0.1060	-0.0836	-0.5511
	LAB	numeraire	numeraire	numeraire	numeraire

Table 54 – Tax simulations. Results for variations in private consumption (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Private Consumption	S1	0.0201	0.2783	0.2984	1.8480
HOH1	S2	0.0188	0.2520	0.2709	1.6730
	S3	0.0208	0.2673	0.2882	1.7812
	S4	0.0211	0.2716	0.2927	1.8115
	S5	0.0286	0.2574	0.2860	1.7583
	S6	0.0212	0.2585	0.2797	1.7265
	S7	0.0186	0.2577	0.2763	1.7073
	S8	0.0183	0.2650	0.2833	1.7530
	S9	0.0214	0.2532	0.2747	1.6936
	S10	0.0206	0.2513	0.2719	1.6768
	S11	0.0179	0.2622	0.2802	1.7333
	S12	0.0229	0.2543	0.2772	1.7051
	S13	0.0171	0.2616	0.2787	1.7229
	S14	0.0206	0.2569	0.2775	1.7128
	S15	0.0229	0.2525	0.2755	1.6972
	S16	0.0321	0.2057	0.2379	1.4446
	S17	0.0245	0.2345	0.2590	1.5885
	S18	-0.8401	0.2456	-0.5962	-2.9199
	S19	0.0228	-0.7148	-0.6923	-4.5051
	S20	0.0204	0.2487	0.2691	1.6572
	S21	0.0187	0.2448	0.2635	1.6235
	S22	0.0179	0.2218	0.2398	1.4715
Private Consumption	S1	0.0090	0.1855	0.1946	1.2101
HOH2	S2	0.0077	0.1593	0.1671	1.0362
	S3	0.0098	0.1746	0.1844	1.1437
	S4	0.0100	0.1789	0.1889	1.1738
	S5	0.0175	0.1647	0.1822	1.1210
	S6	0.0101	0.1658	0.1759	1.0893
	S7	0.0075	0.1649	0.1725	1.0703
	S8	0.0073	0.1723	0.1795	1.1157
	S9	0.0104	0.1605	0.1709	1.0567
	S10	0.0095	0.1586	0.1681	1.0400
	S11	0.0068	0.1695	0.1764	1.0961
	S12	0.0119	0.1616	0.1734	1.0681
	S13	0.0060	0.1689	0.1749	1.0858
	S14	0.0095	0.1642	0.1737	1.0757
	S15	0.0119	0.1598	0.1717	1.0602
	S16	0.0211	0.1130	0.1341	0.8093
	S17	0.0134	0.1418	0.1552	0.9523
	S18	-0.8510	0.1529	-0.6991	-3.5280
	S19	0.0117	-0.8067	-0.7950	-5.1032
	S20	0.0094	0.1560	0.1653	1.0205
	S21	0.0076	0.1521	0.1597	0.9871
	S22	0.0069	0.1292	0.1360	0.8360

Private Consumption	S1	0.0065	0.1779	0.1844	1.1494
HOH3	S2	0.0053	0.1517	0.1569	0.9757
	S3	0.0073	0.1669	0.1742	1.0832
	S4	0.0075	0.1712	0.1788	1.1132
	S5	0.0151	0.1570	0.1721	1.0604
	S6	0.0076	0.1581	0.1657	1.0288
	S7	0.0050	0.1573	0.1623	1.0097
	S8	0.0048	0.1646	0.1694	1.0552
	S9	0.0079	0.1528	0.1607	0.9962
	S10	0.0070	0.1510	0.1580	0.9795
	S11	0.0043	0.1619	0.1662	1.0355
	S12	0.0094	0.1539	0.1633	1.0075
	S13	0.0035	0.1612	0.1648	1.0253
	S14	0.0070	0.1565	0.1636	1.0152
	S15	0.0094	0.1522	0.1615	0.9997
	S16	0.0186	0.1054	0.1240	0.7489
	S17	0.0109	0.1342	0.1451	0.8918
	S18	-0.8535	0.1453	-0.7092	-3.5857
	S19	0.0092	-0.8142	-0.8051	-5.1600
	S20	0.0069	0.1483	0.1552	0.9600
	S21	0.0051	0.1444	0.1496	0.9266
	S22	0.0044	0.1215	0.1259	0.7756
Private Consumption	S1	0.0011	0.1368	0.1379	0.8641
HOH4	S2	-0.0002	0.1106	0.1104	0.6908
	S3	0.0018	0.1258	0.1277	0.7980
	S4	0.0021	0.1301	0.1323	0.8280
	S5	0.0096	0.1159	0.1255	0.7754
	S6	0.0022	0.1171	0.1192	0.7438
	S7	-0.0004	0.1162	0.1158	0.7248
	S8	-0.0007	0.1235	0.1229	0.7701
	S9	0.0024	0.1118	0.1142	0.7113
	S10	0.0015	0.1099	0.1114	0.6946
	S11	-0.0011	0.1208	0.1197	0.7505
	S12	0.0039	0.1128	0.1168	0.7226
	S13	-0.0019	0.1202	0.1182	0.7403
	S14	0.0016	0.1155	0.1170	0.7303
	S15	0.0039	0.1111	0.1150	0.7148
	S16	0.0131	0.0643	0.0775	0.4647
	S17	0.0055	0.0931	0.0986	0.6072
	S18	-0.8589	0.1042	-0.7553	-3.8577
	S19	0.0038	-0.8549	-0.8512	-5.4275
	S20	0.0014	0.1072	0.1087	0.6752
	S21	-0.0003	0.1033	0.1030	0.6419
	S22	-0.0011	0.0804	0.0794	0.4913

Private Consumption	S1	-0.0025	0.1198	0.1174	0.7398
HOH5	S2	-0.0038	0.0937	0.0899	0.5667
	S3	-0.0017	0.1089	0.1072	0.6738
	S4	-0.0015	0.1132	0.1117	0.7037
	S5	0.0060	0.0990	0.1050	0.6512
	S6	-0.0014	0.1001	0.0987	0.6196
	S7	-0.0040	0.0993	0.0953	0.6007
	S8	-0.0043	0.1066	0.1023	0.6459
	S9	-0.0012	0.0948	0.0937	0.5872
	S10	-0.0020	0.0930	0.0909	0.5705
	S11	-0.0047	0.1039	0.0992	0.6264
	S12	0.0003	0.0959	0.0962	0.5985
	S13	-0.0055	0.1032	0.0977	0.6161
	S14	-0.0020	0.0985	0.0965	0.6061
	S15	0.0003	0.0941	0.0945	0.5907
	S16	0.0095	0.0474	0.0570	0.3409
	S17	0.0019	0.0762	0.0780	0.4832
	S18	-0.8625	0.0873	-0.7756	-3.9762
	S19	0.0002	-0.8717	-0.8715	-5.5441
	S20	-0.0021	0.0903	0.0882	0.5511
	S21	-0.0039	0.0864	0.0825	0.5178
	S22	-0.0046	0.0635	0.0589	0.3675
Private Consumption	S1	-0.0042	0.1150	0.1108	0.7006
HOH6	S2	-0.0055	0.0888	0.0833	0.5276
	S3	-0.0034	0.1040	0.1006	0.6346
	S4	-0.0032	0.1083	0.1052	0.6646
	S5	0.0043	0.0941	0.0984	0.6120
	S6	-0.0031	0.0952	0.0921	0.5805
	S7	-0.0057	0.0944	0.0887	0.5616
	S8	-0.0060	0.1017	0.0958	0.6068
	S9	-0.0028	0.0899	0.0871	0.5481
	S10	-0.0037	0.0881	0.0843	0.5314
	S11	-0.0064	0.0990	0.0926	0.5872
	S12	-0.0014	0.0910	0.0897	0.5593
	S13	-0.0072	0.0983	0.0912	0.5770
	S14	-0.0037	0.0936	0.0899	0.5670
	S15	-0.0014	0.0893	0.0879	0.5515
	S16	0.0079	0.0425	0.0504	0.3019
	S17	0.0002	0.0713	0.0715	0.4441
	S18	-0.8641	0.0824	-0.7822	-4.0135
	S19	-0.0015	-0.8765	-0.8780	-5.5808
	S20	-0.0038	0.0854	0.0816	0.5120
	S21	-0.0056	0.0815	0.0760	0.4787
	S22	-0.0063	0.0586	0.0523	0.3284

Private Consumption	S1	-0.0048	0.0950	0.0902	0.5722
HOH7	S2	-0.0061	0.0688	0.0628	0.3994
	S3	-0.0041	0.0841	0.0800	0.5063
	S4	-0.0038	0.0884	0.0846	0.5362
	S5	0.0037	0.0742	0.0779	0.4837
	S6	-0.0038	0.0753	0.0716	0.4523
	S7	-0.0063	0.0745	0.0681	0.4333
	S8	-0.0066	0.0818	0.0752	0.4785
	S9	-0.0035	0.0700	0.0665	0.4198
	S10	-0.0044	0.0681	0.0638	0.4032
	S11	-0.0070	0.0790	0.0720	0.4590
	S12	-0.0020	0.0711	0.0691	0.4311
	S13	-0.0078	0.0784	0.0706	0.4488
	S14	-0.0043	0.0737	0.0694	0.4388
	S15	-0.0020	0.0693	0.0673	0.4233
	S16	0.0072	0.0226	0.0298	0.1740
	S17	-0.0005	0.0514	0.0509	0.3161
	S18	-0.8648	0.0625	-0.8026	-4.1359
	S19	-0.0021	-0.8963	-0.8984	-5.7012
	S20	-0.0045	0.0655	0.0610	0.3839
	S21	-0.0062	0.0616	0.0554	0.3506
	S22	-0.0070	0.0387	0.0317	0.2005
Private Consumption	S1	-0.0064	0.0763	0.0698	0.4463
HOH8	S2	-0.0077	0.0501	0.0424	0.2737
	S3	-0.0057	0.0653	0.0596	0.3805
	S4	-0.0054	0.0696	0.0642	0.4104
	S5	0.0021	0.0554	0.0575	0.3579
	S6	-0.0054	0.0566	0.0512	0.3265
	S7	-0.0079	0.0557	0.0478	0.3076
	S8	-0.0082	0.0630	0.0548	0.3527
	S9	-0.0051	0.0513	0.0462	0.2941
	S10	-0.0060	0.0494	0.0434	0.2775
	S11	-0.0086	0.0603	0.0516	0.3332
	S12	-0.0036	0.0523	0.0487	0.3054
	S13	-0.0094	0.0597	0.0502	0.3230
	S14	-0.0060	0.0549	0.0490	0.3130
	S15	-0.0036	0.0506	0.0470	0.2976
	S16	0.0056	0.0039	0.0095	0.0485
	S17	-0.0021	0.0326	0.0305	0.1905
	S18	-0.8664	0.0437	-0.8228	-4.2560
	S19	-0.0037	-0.9148	-0.9186	-5.8193
	S20	-0.0061	0.0467	0.0406	0.2582
	S21	-0.0078	0.0428	0.0350	0.2250
	S22	-0.0086	0.0200	0.0114	0.0751

Table 55 – Tax simulations. Results for variations in investment (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Investment	S1	-0.0013	-0.0499	-0.0511	-0.3191
	S2	-0.0026	-0.0760	-0.0785	-0.4904
	S3	-0.0005	-0.0608	-0.0613	-0.3844
	S4	-0.0003	-0.0565	-0.0568	-0.3548
	S5	0.0073	-0.0707	-0.0635	-0.4068
	S6	-0.0002	-0.0695	-0.0698	-0.4380
	S7	-0.0028	-0.0704	-0.0732	-0.4568
	S8	-0.0030	-0.0631	-0.0661	-0.4120
	S9	0.0001	-0.0748	-0.0748	-0.4701
	S10	-0.0008	-0.0767	-0.0775	-0.4866
	S11	-0.0035	-0.0658	-0.0693	-0.4313
	S12	0.0016	-0.0738	-0.0722	-0.4590
	S13	-	-	-	-
	S14	-0.0008	-0.0711	-0.0719	-0.4514
	S15	0.0016	-0.0755	-0.0740	-0.4667
	S16	-	-	-	-
	S17	-	-	-	-
	S18	-	-	-	-
	S19	-	-	-	-
	S20	-0.0009	-0.0793	-0.0803	-0.5058
	S21	-	-	-	-
	S22	-0.0034	-0.1061	-0.1095	-0.6875

Table 56 – Tax simulations. Results for variations in savings and disposable income of the households (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Central Gov. savings		0.0362	0.1776	0.2138	1.2919
Regional Gov. savings		0.0656	0.3591	0.4248	2.5756
Disposable income	HOH1	0.0396	0.1935	0.2331	1.4085
	HOH2	0.0285	0.1008	0.1293	0.7733
	HOH3	0.0260	0.0932	0.1192	0.7130
	HOH4	0.0206	0.0521	0.0727	0.4289
	HOH5	0.0170	0.0352	0.0522	0.3051
	HOH6	0.0153	0.0303	0.0456	0.2661
	HOH7	0.0146	0.0104	0.0250	0.1382
	HOH8	0.0130	-0.0083	0.0047	0.0129

Table 57 – Tax simulations. Results for variations in public consumption (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Central Gov. (Public consumption)	S1	-	-	-	-
	S2	-	-	-	-
	S3	-	-	-	-
	S4	-	-	-	-
	S5	-	-	-	-
	S6	-	-	-	-
	S7	-	-	-	-
	S8	-	-	-	-
	S9	-	-	-	-
	S10	-	-	-	-
	S11	-	-	-	-
	S12	-	-	-	-
	S13	-	-	-	-
	S14	-0.0016	0.0933	0.0917	0.5754
	S15	-	-	-	-
	S16	0.0099	0.0422	0.0522	0.3103
	S17	-	-	-	-
	S18	-	-	-	-
	S19	-	-	-	-
	S20	-0.0017	0.0851	0.0834	0.5205
	S21	-	-	-	-
	S22	-0.0042	0.0583	0.0541	0.3369
Regional Gov. (Public consumption)	S1	-	-	-	-
	S2	-	-	-	-
	S3	-	-	-	-
	S4	-	-	-	-
	S5	-	-	-	-
	S6	-	-	-	-
	S7	-	-	-	-
	S8	0.0444	0.4308	0.4752	2.9241
	S9	-	-	-	-
	S10	-	-	-	-
	S11	-	-	-	-
	S12	0.0490	0.4200	0.4691	2.8755
	S13	-	-	-	-
	S14	0.0466	0.4227	0.4693	2.8834
	S15	-	-	-	-
	S16	0.0582	0.3714	0.4296	2.6121
	S17	0.0505	0.4002	0.4508	2.7577
	S18	-	-	-	-
	S19	0.0489	-0.5507	-0.5023	-3.4061
	S20	0.0465	0.4144	0.4609	2.8272
	S21	-	-	-	-
	S22	0.0440	0.3875	0.4316	2.6393

Table 58 – Tax simulations. Results for variations in exports and imports (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Exports	S1	-0.0168	0.0515	0.0347	0.2580
	S2	0.0742	0.0577	0.1318	0.7250
	S3	-0.0218	-0.0579	-0.0798	-0.4542
	S4	0.0656	0.4097	0.4755	2.9697
	S5	0.1025	0.0031	0.1055	0.5350
	S6	0.0419	0.0776	0.1195	0.6976
	S7	0.0162	0.0750	0.0912	0.5459
	S8	0.0727	0.2349	0.3076	1.8248
	S9	0.0398	-0.0393	0.0005	-0.0549
	S10	0.2424	0.0810	0.3234	1.6372
	S11	0.0577	0.1859	0.2436	1.4401
	S12	0.4476	0.2123	0.6602	3.3836
	S13	0.0244	0.0741	0.0985	0.5651
	S14	0.0726	0.0847	0.1574	0.8699
	S15	-	-	-	-
	S16	-	-	-	-
	S17	0.0674	-0.0155	0.0519	0.2174
	S18	-7.5805	0.0060	-7.5734	-35.1596
	S19	0.0129	-2.9545	-2.9420	-17.6909
	S20	0.0012	0.0648	0.0659	0.4033
	S21	0.0221	-0.0107	0.0113	0.0203
	S22	-0.0051	-0.0521	-0.0572	-0.3699
Imports	S1	-0.0313	-0.1089	-0.1402	-0.8277
	S2	0.0311	0.0533	0.0844	0.4755
	S3	-0.0508	-0.2007	-0.2515	-1.4942
	S4	0.0128	0.1029	0.1157	0.7125
	S5	0.0281	-0.0340	-0.0058	-0.0820
	S6	0.0102	0.0171	0.0273	0.1531
	S7	0.0088	0.0265	0.0353	0.2050
	S8	0.0673	0.1182	0.1855	1.0547
	S9	0.0065	-0.0507	-0.0443	-0.2939
	S10	0.1950	0.0911	0.2861	1.4665
	S11	0.0545	-0.0089	0.0456	0.1918
	S12	0.2351	0.1162	0.3515	1.8057
	S13	0.0280	0.0195	0.0474	0.2507
	S14	0.0502	0.0456	0.0958	0.5100
	S15	-	-	-	-
	S16	-	-	-	-
	S17	0.0293	0.0827	0.1121	0.6534
	S18	1.0580	0.0707	1.1291	6.2363
	S19	-0.0080	1.0025	0.9945	6.6240
	S20	-0.0107	0.0789	0.0683	0.4436
	S21	0.0159	0.0340	0.0499	0.2863
	S22	-0.0061	0.0867	0.0806	0.5191

Table 59 – Tax simulations. Results for variations in total production and welfare (in percentages)

		SC4	SC5	SC6	SC7
		VAT from 8% to 10% in accommodation	VAT from 8% to 10% in restaurant services	VAT from 8% to 10% in accommodation and restaurant services	VAT from 8% to 21% in accommodation and restaurant services
Total production		0.0322	-0.0025	0.0297	0.1323
Hicksian equivalent variation	HOH1	412.2014	3689.9063	4101.9897	24610.3785
	HOH2	249.8134	1016.6276	1266.2727	6495.1326
	HOH3	-207.6152	-542.1599	-749.7594	-5717.5139
	HOH4	-101.8178	-1992.4306	-2094.1187	-14323.7615
	HOH5	-576.9342	-4872.7243	-5448.8325	-35773.6941
	HOH6	-1165.2184	-3771.8789	-4935.7847	-31802.0161
	HOH7	-1337.1098	-5341.0463	-6676.3483	-42516.1070
	HOH8	-2721.3525	-10261.8481	-12978.4242	-81441.2595
Change in utility	HOH1	0.0189	0.1689	0.1878	1.1267
	HOH2	0.0077	0.0315	0.0393	0.2015
	HOH3	-0.0078	-0.0205	-0.0283	-0.2157
	HOH4	-0.0033	-0.0652	-0.0685	-0.4686
	HOH5	-0.0113	-0.0951	-0.1063	-0.6981
	HOH6	-0.0209	-0.0676	-0.0885	-0.5702
	HOH7	-0.0247	-0.0987	-0.1233	-0.7854
	HOH8	-0.0387	-0.1458	-0.1843	-1.1568

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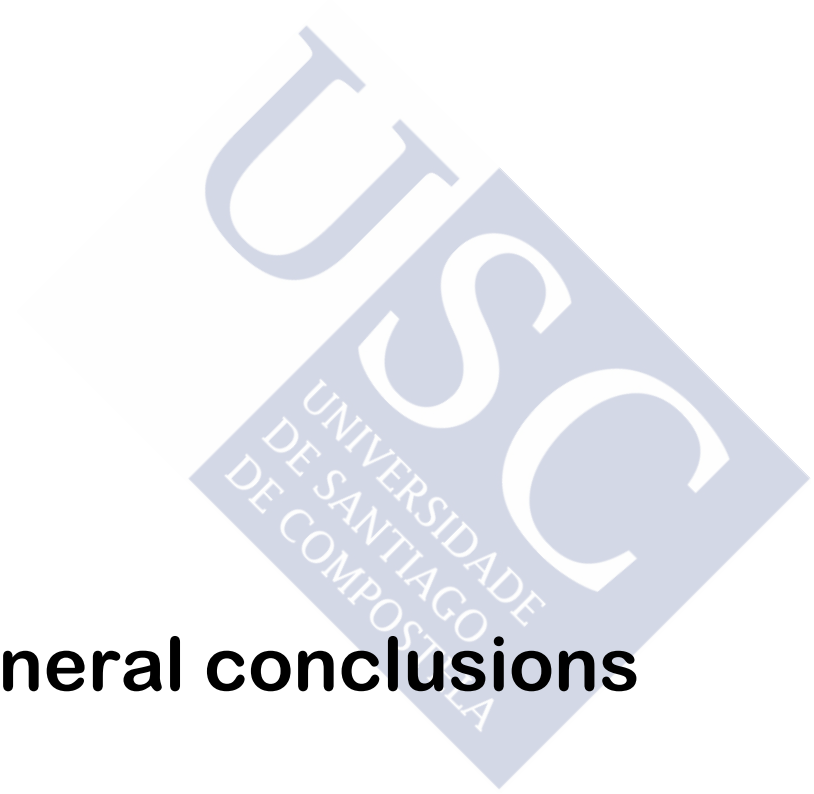

General conclusions

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In this final section we briefly present the main results that have been achieved during the thesis. We will show the most relevant findings and conclusions through a set of answers to questions that motivated us to start this research work.

Therefore, to situate the context of our study, first of all: **what is tourism from a socioeconomic perspective? How this concept is interpreted by the main official statistics?**

As explained in the introduction, following the International Recommendations for Tourism Statistics (IRTS) of the year 2008 (UNWTO, 2010), the concept of tourism is defined as a set of activities (social, cultural and economic) related with the movement of people to places outside their usual place of residence (who are called visitors). So, It is not constrained to what are often considered "typical" tourism activities (i.e. seasonal visits with the aim of sunbathing on the beach or sightseeing), but including other types of displacements such as those made for business or other personal reasons (visiting relatives or friends, for example). In other words, what converts a product into touristic or not is the kind of consumer who buy it (visitor). However, visitors consume different products depending on the purpose of the trip (with territorial and temporal characteristics associated).

And therefore, secondly: **which is the type of tourism existing in Galicia?**

It must be noted that tourism does not present the same characteristics for the different regions of Spain (Pérez Dacal *et al.*, 2013) and, consequently, the type of tourism existing in Galicia has some special particularities. Using the information provided by the Institute of Tourism Studies (IET) and the hotel occupancy survey (HOS) elaborated by the National Statistic Institute (INE), we consider both the characteristics of the demand and supply of tourism. Comparing Galicia with the other Spanish regions, it can be seen that this region is specialized in national inbound tourism, showing a high number of establishments but of a smaller size. For example, Galicia presents 5 employees in average and about 40 beds per establishment while the Canary Islands show 70 employees and around 400 beds per establishment.

Then: **how can be measured the economic contribution of tourism consumption? Is there any difference for regional economies?**

Since it is not possible to identify tourism as a single sector within the national accounting system, we cannot directly calculate its contribution to an economy as we usually do (as a share of the total GDP or total employment). For this reason, different macroeconomic tools were developed in the 80s and 90s with the purpose of measuring the economic contribution and impact of tourism. Among them, Input-Output (IO) is the model generally used by economists to measure sectoral interdependencies, to quantify production impact or to compare the economic structure of different economies.

As we have seen during the whole thesis, results indicate that, in terms of development, the expansion of tourism can have a positive impact on the generation of income and employment in a region. However, this impact could have a different intensity across regions due to two main effects: 1) the sectoral interdependence, i.e. the economic linkages of tourism products with the remaining products of the economy and 2) the trade dependency with other economies (the smaller the economy, the greater would be the amount of imports needed and, so, its dependency with other economies would be higher, too). In the first case, the stronger are these linkages, the greater would be its positive economic impact. However, in the second case, a large trade dependency causes higher "leakages" in the production process, lowering the effects on the economy (in terms of domestic production).

Which are the productive effects of tourism for Galicia? And the labor market effects?

Results obtained in chapter 1 suggested that tourism consumption represents in Galicia 4.1% of the Domestic Output, 4.7% of the GVA and 4.1% of the employment, i.e. 47,286 full-time jobs, for 2007. For the rest of Spain, the results double the economic contribution of the ones for Galicia (8.4% of the Domestic Output, 8.7% of the GVA and 8.1% of the total employment or 1,453,775 full-time jobs).

However, the evolution of those macroeconomic figures during the 2001-2007 period is not particularly constant. In fact, we could distinguish two different periods: a continuous growth until the Xacobeo 2004 (achieving 5.0% of the Domestic Output, 5.5% of the GVA and 4.6% of the employment, 48,877 full-time jobs) and a fall after that year. This evolution is mainly provoked by the inbound consumption made by the

nationals (living in the rest of Spain), which represented approximately the 60% of the total tourism consumption.

In addition, we have also found that there are important spillover effects showing economic asymmetries between Galicia and the rest of Spain. As could be expected, the Galician productive structure needs to import more products to satisfy its tourism demand (0.30€ of domestic production per each euro of final demand) than the rest of the country needs Galician products (0.013€). Following this, this reveals also that the Galician productive structure can be considered as not specialized on the production of goods and services demanded by visitors, within the Spanish context.

Results on the labour market effects of inbound tourism consumption revealed that the medium-skilled wage earners and the Gross Operating Surplus/Gross Mixed Rents (capital revenues and self-employed) are the ones more affected. Additionally, results suggested that self-employment revenues play a more important role than wages in the earnings channel. This is a consequence of the type of tourism existing in Galicia. As we already explained, Galicia presents a high number of establishments but with a small size. These supply characteristics of the accommodation services are the reason that causes the high percentage of self-employment.

Which is the main impact on households? Does tourism reduce income inequality?

There is a big debate on what are the effects of tourism development on the poorest households of a region. Literature suggests that tourism has great economic impacts in terms of generation of revenues for the institutional agents of a society (households, government and firms) and creation of jobs. However, its contribution to poverty reduction when the full circular flow of income is considered, it is not clear. In addition to the analysis of Brazil by Blake et al. (2008), Wattanakuljarus and Coxhead (2008) also found that an inbound tourism expansion is not pro-poor in Thailand, using a CGE model. Moreover, another study of Blake (2008) with a set of Social Accounting Matrices (SAMs) for three countries of the East Africa sub-region (Kenya, Tanzania and Uganda) demonstrate that the hotels and restaurants industry has high backwards linkages with the rest of the economy, but also provides below-average shares of income to poor households.

However, these previous empirical works are all carried out for countries and not for regions and they are all referenced to developing economies. In Chapter 3, we present an analysis of the distributive effects of inbound tourism consumption for Galicia, using a SAM multipliers model.

Although, we could not see many differences in households by income level, it is true that high-income households obtains more revenues from inbound tourism consumption than low-income households (5.78% and 5.74% respectively). In other words, redistributive effects from governments due to taxes and social benefits (which increase the revenues of low-income families) do not compensate the earnings channel (which benefits more the richest households), slightly increasing income inequality.

Which are the welfare effects on the resident households of an increase in tourism consumption?

In terms of welfare effects, results are in line with the previous literature on the topic. In a similar way to the studies of Wattanakuljarus and Coxhead (2008) and Blake *et al*. (2008), results indicated that an expansion on inbound tourism increases the social welfare of Galicia. However, all the scenarios benefit more the high-income households than the low-income ones.

And finally, from these lasts results it appears a new question. Should the increase international competitiveness of the sector be pursued or not? This means to alter the indirect tax rate of products related to tourism consumption, so: **which is the impact of an increase in the VAT rate of tourism products for Galicia?**

As we have seen, governments have some monopoly power on the market of products consumed by visitors and this can be used to extract income from them through taxes. The degree of inelasticity of demand depends mostly on the degree of differentiation of the destination. The greater the degree of differentiation of the destination, the more inelastic demand will be and, therefore, the greater the possibility of taxation (Gooroochurn and Sinclair, 2003).

Therefore, Blake (2000) elaborates a CGE model for analyzing the effects of an increase in taxes on foreign tourism in Spain. In this paper, results show that this increase in tax rates will cause a welfare gain for the residents, since visitors are the ones that receive

most of the negative effects of the tax (with the rise of prices) and the consequent decrease in welfare. Gooroochurn and Sinclair (2005) presented a similar study for the economy of Mauritius, finding also that taxing foreign visitors increases domestic welfare. Another outcome in this paper is that increasing taxes on tourism-related sectors also reduces income inequality, since richer households have a higher proportion of consumption of tourism products than low-income ones.

Results obtained for Galicia show that an increase in the tourism products VAT rate causes a negative impact on the sectors of accommodation and restaurant services. Additionally, as prices of these activities also grow, tourism in other regions or countries becomes relatively cheaper than visiting Galicia, lowering exports and, consequently, increasing imports.

Furthermore, in terms of welfare, increasing the VAT rate on tourism products would increase the utility of low-income households, but the middle- and high-income households would be worse off. This result can be related with the different consumption patterns, showed in chapter 2. Low-income households spend a relative higher percentage of their revenues on basic products, while the high-income households have a relative higher percentage of expenditure on hospitality services.

Therefore, this scenario would decrease inequality in terms of disposable income, but also social welfare in general. However, this latter result is contrary to the ones obtained by previous studies. This is related with the importance of domestic tourism over the total tourism demand, representing about 30% for Galicia, and that is expected to be much lower for the developing countries analyzed in the literature. In other words, we can conclude from the results obtained that taxing accommodation services would charge the effect mainly on the inbound consumption (relocating rents from non-resident visitors to resident households through governments) while, on the restaurant services case, tax would be levied on the domestic consumers, both final and intermediate ones.

1. Main contributions of this thesis

To our knowledge, in this thesis there are several original contributions. Starting from the first chapter, we offered the first report showing the trade interactions between a

small open sub-national economy and the rest of the country that tourism consumption involves.

In the second chapter, we showed the first SAM for Galicia. It must be noted that from the Galician Statistical Institute (IGE) it was elaborated a preliminary effort on a Galician SAM also for the same year 2008. We found insufficient this attempt by the IGE since it is not a complete SAM, but a five-sector use matrix, extended in productive factors by skill levels and gender (IGE, 2013).

The third chapter presented also the first paper on the distributive effects of tourism consumption for a regional economy. We use the SAM decomposition analysis which allows us to distinguish between direct, indirect and feedback multipliers in order to shed some deeper light on this recent topic. Moreover, it also add some evidence to the existing literature (after the ones of Wattanakuljarus and Coxhead (2008), Blake *et al.* (2008) and Blake (2008)).

Finally, on the last chapter, it was offered a first attempt on a CGE model for Galicia. But also, it is a multi-household CGE model for measuring tourism and its welfare effects for a region that can be included as an empirical work on the macroeconomic impact of tourism taxation (after the articles of Blake (2000) and Gooroochurn and Sinclair (2005)).

2. Future work

Writing a thesis is more a first step than an ending point in your research career. In fact, as the thesis progresses, you realize that you are probably opening more questions for the future than answering the ones you settled at the very beginning. So having this in mind, in this final section we are going to present some possible further research for the future that have a direct link with the topics worked here.

Following the same order of the chapters, one of the first points that arise directly from this research is to try to extent the interregional model to a nine-region Spanish model. As we stated at the introduction of the thesis, in Spain there are various types of tourism, and with such analysis we would be able to see if these differences can be translated in differences also in the resulting macroeconomic impacts of tourism consumption. Moreover, the analysis of spillovers between regions would reach another

dimension, giving us information on which tourism demand has more effects on the rest of the Spanish regions.

Another future issue, regarding the economic impact of tourism, is to consider also environmental effects as possible negative impacts. Estimating the impact of tourism on an economy means to estimate both benefits and costs associated with tourism. To satisfy the touristic final demand vector the economy needs to produce a range of goods and services. During this production we get not only goods but also physical waste that we return to the environment. Thus, a major externality (incidental costs) is that related to environmental degradation and, in addition, of the quality of life.

Moreover, a future comparative analysis between regions about the income distribution effects of tourism consumption would be interesting. These economy-wide models applied during the thesis are characterized by considering the productive and sectoral structure of the economy. By doing this, results will also depend on this structure. A comparative analysis between regions will give us the answer of whether tourism reduces poverty or inequality or not, in a wider sense.

Finally, on the subject of CGE models there are several points that arise for the forthcoming work. The first one is to learn more about closure rules and their effects on the results obtained. Moreover, a dynamic specification approach would be desirable in order to correct the way in which investment and savings are introduced in the present static model. Regarding other applications using a CGE framework, there appear two different subjects: labour market issues and estimate the impact of other types of tourism taxes concerning sustainability issues. Focusing on the first goal, it is necessary to model unemployment and considering different types of workers (distinguishing by types of contracts and skill levels). For the second topic, it would be also interesting to assess the economic and social impact of eco-taxes or pigouvian taxes applied to correct the negative externalities generated by tourism activities and tourism consumption.

However, we are talking about research lines for the future and, yes, uncertainty is its most representative characteristic.

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