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THE LONG-TERM EVOLUTION OF INTERGENERATIONAL TRANSFERS IN SPAIN
(1958-2012)

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NATIONAL TRANSFER ACCOUNTS NETWORK

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ABSTRACT

National Transfer Accounts (NTA) aim at disentangling how people produce, consume and save along the lifecycle, and how resources move among generations through the different resource allocation devices available (family, market and government). This paper extends the available Spanish NTA estimates (2000-2012) to the past until 1958, to analyse changes in intergenerational transfers associated to long-term processes such as the demographic transition and the welfare state development. For 1980 and 1990, we provide new estimates based on the Spanish Household Budget Surveys (HBS) while, for previous periods in which HBS do not provide enough information, we resort to the available evidence on demography, national accounts and public finance. The long-term evolution of Spanish NTA shows the increasing weight of government transfers as a device to reallocate resources across generations and the growing importance of the elderly in the system of intergenerational transfers as a result of population ageing.

Keywords: Ageing, Intergenerational Transfers, National Transfers Accounts, Redistribution, Welfare State

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NATIONAL TRANSFER ACCOUNTS
Understanding the generational economy

1. Introduction

In addition to the most usual dimensions of the analysis of redistribution, the demographic transition has raised the need to investigate differences in welfare between age groups. Since individuals consume along their whole life but they only produce resources through labour during a limited period, all societies require sustainable systems of inter-age resource reallocations. The National Transfer Accounts (NTA) approach aims at measuring how resources move among generations through the different resource allocation devices available in order to cover the dependent groups' consumption needs. i. e., either through the market – asset-based reallocations - through government intervention –tax payment and transfers receipts – or through private (intra or inter-household) transfers. Interestingly, those mechanisms can act, both in the public and the private sector, inter-temporally (in the case of asset based reallocations) or intra-temporally (in the case of the pay-as-you-go financed systems), or somewhere in between when pay-as-you-go rules coexist with debt accumulation.[1]

The NTA approach was born at the end of the last century out of a discussion among researchers from different disciplines on the impact of population dynamics and the age structure on the economy. The relevance of the NTA analysis has increased over time as the ageing process moves ahead, posing a serious challenge on advanced societies. The NTA estimates offer valuable information to evaluate the future sustainability of the welfare state and to inform policy recommendations in key areas such as pensions, health and long-term care, education and fertility. In this sense, they share some basic elements with Generational Accounting (GA), a projection method which, starting from the age distribution of public taxes and transfers (one of the elements measured in NTA), evaluates the sustainability of the intertemporal budget constraint of the government as population ages (Auerbach and Kotlikoff,

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[1] The pay-as-you-go financing rule is well known as an option used for the pensions system, but it is also used in other programs of the public sector in an implicit way, as long as current expenditure is covered by current general taxes, not linked or earmarked to a particular program (for example the health system).

1999). More generally, NTA give a quantified picture of the economic importance of the human lifecycle and allow the comparison among very different intergenerational economic systems, with varying roles for families, firms, markets, the state and the civil society in funding the consumption needs of the dependent population.

The international NTA project has developed a system of economic accounts, largely based on the information provided by national micro surveys on consumption and income, which quantifies intergenerational flows in a comprehensive fashion. NTA estimations are fully consistent with National Accounts aggregates for each country, but provide precious additional information about the ages of producers, consumers, and transfers' givers and recipients. Moreover, NTA provide, for the first time, information about private transfers' flows, both at intra and inter-household level, which at the aggregate level are zero but become crucial to understand the intergenerational economic relations. Overall, NTA have been the basis of a large dataset of intergenerational transfer accounts for economies with different cultures, levels of development, economic systems and policies.[2] These intercountry comparable data allow investigating the role of intergenerational transfers in the economy, which are still under question in the economic literature. In particular, the demographic transition has triggered a growing literature on the interaction between fertility, growth and the development of the welfare state.[3] Our historical analysis is especially valuable to grasp the way in which the extension of the public sector crowds out private transfers. The extent of this crowding out depends, first, on the motives for private transfers and second, on the need for public intervention in each particular welfare state program.[4]

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[2] On the NTA approach see the project website (www.ntaccounts.org) and Lee and Mason (2004, 2011), UN (2013), and D'Albis and Moosa (2015).

[3] On the one hand, see Rangel (2003) for an interesting attempt to investigate the political sustainability of both forward (from parents to children) and backward (from adult to elderly) transfers in a partial equilibrium setting. On the other hand, see Galor (2011) for a comprehensive treatment of endogenous fertility in an endogenous growth setting.

[4] The literature is quite fragmented both in the several disciplines involved and in the variety of existing welfare state programs. See Patxot et al. (2012) who connect this literature to the seminal theoretical works by Samuelson (1958 and 1975) both focused on backward age reallocations, when fertility is completely exogenous, and when the planner chooses the optimum rate of population growth, respectively.

In the context of the NTA project, this paper aims at approaching the changes in the system of intergenerational flows in Spain in the very long-term, from the mid-20th century to the early decades of the 21st century. In order to do this, it combines two different sets of estimates. In the case of the later period, from 1980 onwards, the paper presents a number of estimates that apply the standard NTA methodology, thanks to the availability of complete Household Budget Survey (HBS) information for 1980-81, 1990-91 and yearly since 1997. By contrast, before 1980, in the absence of similar data, we provide several estimates based on the available information on the level of development of the economy, the country's demography and public finance. While the quality of these estimates is not comparable to that of later benchmarks, we consider that this disadvantage is more than compensated by the possibility to obtain a very long-term picture of the evolution of intergenerational transfers in the country. By adding those earlier estimates to the standard ones, we can observe (even allowing for a relatively high error margin) how the transformation of Spain, from a poor, largely agrarian and relatively young society with no significant social policies in the mid-20th century, to a high-income, industrialized and aged society with an extensive welfare state in the early 21st century, completely transformed the system of intergenerational transfers.

This long-term analysis provides three essential results. Firstly, starting in the 1960s we observe an increasing importance of public transfers as an intergenerational resource reallocation device, at the expense of other (private) systems. While in the late 1950s government transfers were totally marginal in funding the consumption of the dependent population, in the early decades of the current century they have become one of the most important reallocation systems (particularly for the elderly). Secondly, along the period under study, the structure of the Spanish dependent population and, therefore, intergenerational transfers, has changed dramatically, from a situation in the mid-20th century in which children absorbed the largest share of the transfers, to the present, when the elderly have reached a

dominant position as transfer recipients. As a result, the long-term picture that is presented in the next sections clearly illustrates the bias of the Spanish welfare state towards favouring the elderly. This bias was already patent at the beginning of the period under study but has been consolidated and even expanded over time.

The paper is organized as follows. Next section provides a short overview of the changes that have taken place in the Spanish economy, demography and the public sector since the late 1950s and that are essential to understand the evolution of the system of intergenerational transfers. Section 3 explains the NTA approach, while Section 4 describes the different methodologies that have been applied to estimate Spain's NTA between 1958 and 1990, distinguishing between the more standard estimation techniques applied for 1980-1990 and the alternative methods used to estimate NTA before 1980. Finally, Section 5 analyses the changes in the Spanish NTA profiles between 1958 and 2012, by combining the new estimations for 1958-1990 with those previously available for the period 2000-2012. Section 6 concludes.

2. The Spanish economy since the mid-20th century

Between the mid-20th and the early 21st centuries, the Spanish economy experienced a radical transformation. At the beginning of this period, by 1950, the country was still suffering the effects of the Spanish War (1936-39) and the long stagnation of the postwar years. The 1940s and 1950s were the decades in which the Spanish income per capita reached its minimum relative to its industrialized neighbours. However, the 1950s were also the start of a long-lasting process of accelerated economic growth. Indeed, Spain was one of the world's fastest growing countries during the second half of the 20th century, and such rapid growth allowed the country to substantially reduce its distance from the richest Western economies.[5] By the year 2000,

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[5] According to the Maddison Project database, in terms of per capita GDP growth Spain would rank 14th out of 145 economies with data between 1950 and 2000.

Spain's income per capita was almost 8 times as high as in 1950. Unsurprisingly, the evolution of the Spanish economy during the second half of the 20th century has often been characterized as a success story (see e.g. Calvo-González, 2021). Despite the recurrence of several crisis, economic growth and convergence went on until the beginning of the 21st century, from which the Spanish economy has virtually stagnated due to the accumulated impact of the Great Recession and the COVID crisis.

GDP growth has been accompanied by a profound structural transformation of the economy. In 1950, 48% of the Spanish active population was employed in the agrarian sector, while today this percentage is lower than 4%. The reduction in the demographic share of agriculture has been associated with the increase in the importance of industry and services and with an intense urbanization process. People living in cities of 10,000 inhabitants or more has increased from ca. 50% in 1950 to ca. 80% today.[6]

That process of economic transformation has had a profound and long-lasting impact on the Spanish generational economy. In addition to the generalized increase in income and consumption levels of the Spanish population, the country's economic modernization has had two consequences that have completely changed the systems of intergenerational transfers: i) the changes in the age structure of the population; and ii) the growth of the government sector and the development of the welfare state.

By 1950, the age distribution of the Spanish population was typical of a developing country, with people younger than 15 amounting to 26% of the total, while those older than 64 representing ca. 7%. This structure was associated to a relatively low life expectancy at birth (60 for men and 64 for women) and a very high birth rate (20‰), since Spain was still in the middle of its demographic transition.[7] Subsequent health improvements associated to the

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[6] See Nicolau (2005) and www.ine.es.
[7] Goerlich Gisbert and Pinilla Pallejà (2006).

process of economic development and the expansion of public services have mitigated some mortality risks and increased life expectancy to one of the highest levels in the world (ca. 80 years old for men and ca. 85 years for women). In parallel, due, among other factors, to the increase in female activity rates and the expansion of the educational system, birth rates have decreased substantially, stabilising around 7% in the early 21st century. In fact, Spanish fertility is nowadays one of the lowest in the world, which reflects the intensity of the demographic transformation of the country.[8] As is usual in demographic transitions, though, the decrease in birth rates followed the decrease in mortality with some delay, and this explains that Spain experienced an intense *baby boom* between the late 1950s and the late 1970s, before the reduction of fertility to the current (very low) levels.

Spain in the mid-20th century was also characterized by the absence of a proper welfare state. Public revenues stagnated after the Civil War of 1936-39, due to a large extent to the resistance of the authoritarian regime to reforming a tax system that had been established in the mid-19th century. Public expenditure was only 10% of GDP in 1950 and public social spending (including education) was just 4.5% of GDP in that year. Those levels would only start growing in the late 1960s with the consolidation of the social security system. However, until the democratic transition, the growth of the public sector was sluggish and it was mainly funded with social contributions, due to the regime's reluctance to develop a new tax structure. Thus, in 1976, public social spending was still 14% of GDP, i.e. much lower than in the rest of Western Europe. Democracy brought both tax reform and convergence with the neighbouring economies in terms of social policies. Indeed, public social spending reached a peak of 28% of GDP in 1993, to fluctuate thereafter around 24%.[9] As a consequence of that growth, public

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[8] In 2020, Spanish fertility rate was only 1.23, the second lowest in the EU after Malta (1.13) (www.data.worldbank.org).
[9] Social spending figures come from Espuelas (2013) and include education. The ratio total public expenditure/GDP is calculated based on Comín and Díaz (2005) and Prados de la Escosura (2017).

consumption and government transfers would become essential for the Spanish dependent population to satisfy their consumption needs. Thus, both the changing age structure of the population and the expansion of the welfare state radically altered the Spanish system of intergenerational transfers. The next sections aim at analysing those changes in some detail.

3. The NTA approach

National Transfer Accounts (NTA) provide an accounting of economic flows to and from residents in a country in a given year, classified by age (Lee and Mason, 2004 and 2011).[10] They provide information about the economic life cycle and age reallocations, giving a cross-sectional picture of the intergenerational transfers occurring in an economy. The aggregate values of NTA are consistent with each country's National Accounts (NA), but they give information about how resources are allocated across ages, including an otherwise missing estimation of private transfers. The construction of NTA started in the last years of the past century as a collaborative international network. The first results for twenty-three countries - including Spain- were published in 2011 (Lee and Mason, 2011). As of early 2023, the NTA project involves 98 countries over the world, which are home of 6.6 billion people,[11] and its methodology manual has been published by the United Nations Population Division (United Nations, 2013).

The NTA starting point is the fact that individuals consume along their whole life but they can only produce resources during a limited period (usually their working age). More specifically,

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[10] The main emphasis in the NTA approach is in the flow account (which is also the object of attention of this paper). However, more generally, the NTA project aims at building 4 accounts: 1) flow account; 2) asset transfer account (measuring bequests and other asset transfers); 3) wealth revaluation account (measuring changes in wealth due to changes in asset prices, interest rates, and public policy); and 4) wealth account (measuring the wealth associated with each flow – assets and transfer wealth). For a recent attempt to measure all those dimensions (Generational Wealth Accounts) see McCarthy et al. (2022).

[11] https://ntaccounts.org/web/nta/show/NTA%20Countries (accessed 23/01/2023).

children and the elderly are typically dependent and must rely on people in their productive age range to finance their consumption. Therefore, a system to reallocate resources across ages is needed. There are different alternative systems to cover consumption deficits between age groups, and the NTA approach classifies them in three main categories: family transfers, government transfers and capital market reallocations. In this regard, in order to analyse intergenerational transfers, the NTA methodology is based on the following transformation of the basic national account identity for a given year:

$$YL + YA + TG^+ + TF^+ = C + S + TG^- + TF^- \qquad [1]$$

The left-hand side of expression [1] represents the sources of income received by individuals. YL is labour income, YA is asset income and TG+ and TF+ are public and private transfers received. The right-hand side of the expression shows income uses: C is consumption, S stands for savings and TG- and TF- are transfers from individuals to the public sector and to other individuals respectively.

C and S are the sum of both public and private flows. Consumption, for instance, accounts for all households' public and private consumption, including public education and healthcare services (both public and private) that are consumed by individuals. Similarly, savings include both the private savings of the households and firms and the aggregate government savings, which are shared by the whole population.

(Public and private) transfers are those flows of economic resources, either monetary or in-kind, that do not involve any expected return or exchange. They can move "forward" (from older to younger generations) or "backward" (from younger to older generations). Received (positive) public transfers (TG+) typically include government expenditure in education and healthcare, but also pensions and other types of money benefits. Negative public transfers (TG-) are taxes and social contributions paid. Private transfers include, for instance, children's

maintenance by their parents, but also any kind of intra-household or inter-household donations, which are positive (inflows) (TF+) from the viewpoint of the recipient and negative (outflows) from the viewpoint of the sender (TF-).

Rearranging we obtain the following expression:

$$C - YL = (YA - S) + (TG^+ - TG^-) + (TF^+ - TF^-) \qquad [2]$$

In expression [2], the left-hand side represents the Life Cycle Deficit (LCD), defined as the individual's excess of consumption over labour income. This deficit must be financed through reallocations of resources, that can take place in three different ways. The first is named asset-based reallocations (ABR), defined as the difference between asset income and savings (YA-S). It accounts therefore for those economic sources that can be accumulated and dis-accumulated along the lifecycle. If ABR is positive, this means that the individual is using asset income or dissaving to cover her life cycle deficit. By contrast, if it is negative, the individual is saving (i.e. not using) part of her income and accumulating wealth. The second and third reallocation systems are net public transfers (TG); and net family transfers (TF). These terms are calculated as the difference between inflows (+) and outflows (-). Thus:

$$LCD = ABR + TG + TF \qquad [3]$$

Equation [3] holds both for the individual, the whole economy and each age group in particular.

LCD is the key concept of the generational economy. Broadly speaking, the NTA analysis studies the dynamics of LCD through three different periods of individuals' lives. In the first one, LCD is positive, as children do not work, and therefore consume more than their (null or very low) labour income. This is followed by the working age, a period of surplus, when individuals produce more than they consume and may transfer resources to the dependent groups and accumulate wealth. Finally, in the third period individuals fall back into deficit as they enter retirement or their labour earnings are insufficient to cover their consumption.

When LCD is positive, it must be financed through the three mechanisms in the right-hand of equation [3]. More specifically, children are expected to finance their LCD mainly through family transfers (TF) and public transfers (TG), like public education and health services. In the case of the elderly, they receive an important amount of TG (via public pensions and health services), but they are also likely to get resources from ABR, i.e. by dissaving and from asset income, while TF may be either positive or negative (for instance, if there are transfers from the elderly to younger family members).

When LCD is negative, labour income is higher than consumption. This may be associated to a negative ABR (if the individual can save), a negative TF (if the worker uses part of her income to meet the consumption needs of the dependent members of her family) and a negative TG (if the taxes paid by the worker are higher than the value of the public transfers and services that she receives). Equation [3] allows uncovering the essential features of the so-called "generational economy" (Lee and Mason 2011): the standard of living of a society crucially depends on the success of the working-age population to generate enough resources to finance the LCD of the two economically dependent age groups (children and the elderly). The inability to meet this goal will translate into high poverty rates among children, the elderly or both, with high costs in terms of welfare and the society's development prospects.

4.   Estimating long-term historical NTA series for Spain: methods and data

Estimating the NTA of an economy for a specific year is a data-intensive process that requires collecting a large amount of information from many different sources. In this paper, we present estimates of the Spanish NTA for several benchmark years, covering more than five decades. Estimations were previously available for years 2000 (Patxot et al., 2011) and 2012 (Solé et al., 2019). This section presents the methods and data used to construct NTA for 5 previous

benchmark years (1958, 1963, 1973, 1980 and 1990), distinguishing between the earliest and latest estimates, as they are based on substantially different procedures.

Since the main goal of NTA estimations is to measure the allocation of resources across the population of an economy by age, the most critical requirement to estimate the accounts is information on consumption, income and other variables of the individual members of that society. This is usually provided by micro surveys conducted by the national statistical offices. In Spain, the National Institute of Statistics (INE) started conducting this kind of micro surveys in 1958 (*Encuesta de Presupuestos Familiares*), a Household Budget Survey (HBS) which included data on consumption, income and socioeconomic characteristics from a representative household sample. It was aimed at knowing the level and structure of consumption expenditures in the average Spanish household. It therefore excluded certain population groups, such as families with very high income or those whose household head was unemployed. A second HBS was carried out in 1964, in this case without population restrictions and with much more detailed information on incomes and expenditures. The 1973-74 HBS was even more complete than the previous one, with more exhaustive information about budgets (expenditure, revenue and savings) and a much better sample design, based on the General Population Survey. This was followed by the 1980-81 and 1990-91 HBS, the first ones to apply the European Economic Community (EEC) recommendations. Thanks to the work done by a team of the Carlos III University of Madrid, microdata from the 1973-74, 1980-81 and 1990-91 HBS are also digitized and ready to use in modern computers.[12]

In 1997, those "structural" HBS were replaced by the so-called "continuous" HBS, whose data are available on a yearly basis. Moreover, an additional micro survey was launched in 1994, in order to capture income with more detail, at the cost of separating it from consumption: the

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[12] http://www.eco.uc3m.es/investigacion/epf.html

European Community Household Panel (ECHP), which was implemented in 1994-2001. It would later be replaced, from 2004 onwards, by the Statistics on Income and Living Conditions (SILC). Consequently, NTA estimations since 1994 necessarily require using both micro surveys (HBS for consumption and ECHP or SILC for income). By contrast, before 1994 the information for both consumption and income is contained in the HBS.

The earliest Spanish HBS to which the standard NTA methodology can be applied is the survey carried out in 1980-81. Before that year, this method is not feasible for several reasons. First, in the case of the earliest surveys (1958 and 1964) the original microdata are not available. Second, in the case of the 1973-74 HBS, although the survey microdata are available, they only provide information at the household level, offering little or no useful data about household composition and the individual characteristics of each household member, starting with age, which is crucial for the NTA analysis.

The 1980/81 survey was based on a representative sample of 23,791 households, including 88,540 individuals, with details on their yearly consumption of 632 categories of goods and services. Similarly, the 1990/91 survey was based on a sample of 21,155 households and 72,123 individuals, and considered 918 consumption items. Both surveys provided information on each individual's different types of yearly income, and all the necessary data to estimate NTA (age, occupational status, educational status, etc.). All this information allows creating profiles of private consumption and labour income by age for those years. Very importantly, it also allows decomposing income into different categories, a decomposition that is required to study intergenerational transfers. Particularly, it is necessary to distinguish labour income (from wages and self-employment), income from household rents, imputed household rents, capital income, and income from other sources, such as inter-household and intra-household transfers as well as transfers from the government in the form of social benefits (pensions, unemployment benefits etc.).

In order to estimate the flow of resources within and across households and institutions, it is necessary to decompose consumption data into welfare-relevant categories: consumption of education services, of health services and all other types of consumption; and further decompose these categories into public and private, based on their origin. Information on the private component of consumption of healthcare services is available in the HBS, while that of publicly provided healthcare comes from the Spanish National Health Survey (*Encuesta National de Salud*) carried out by the Ministry of Health, which offers information on the cost and utilization of primary care, hospitalization and pharmaceuticals. Unfortunately, that survey only began in 1987 and has not been conducted yearly. Therefore, we had to use the age profile observed in 1987, combined with the 1980 aggregates, to estimate the public health age profile for 1980. Regarding education, information on each individual's utilization of education services and current educational status is also available in the HBS. We combine those data with aggregate information on enrolment per level of education and age of the enrolled, taken from INE's Spanish Education Statistics (*Estadística de la Enseñanza en España*).

Based on the previous information, we have been able to estimate complete NTA for Spain for 1980-81 and 1990-91, which complement previous estimations available for 2000 (Patxot et al., 2011) and 2012 (Solé et al., 2019). These four estimates cover a period of more than 30 years and are based on the standard NTA methodology. As advanced before, we unfortunately cannot apply the same estimation method to earlier benchmarks. This is also the case in other countries, as the longest available longitudinal analyses of NTA only start in the late 1970s (see, e.g. D'Albis et al., 2015, or Temple et al., 2017). The study of a longest time horizon, however, is interesting because it would allow capturing the whole impact on intergenerational transfers of processes such as the construction of the welfare state or the demographic transition. In most European countries, for instance, the growth of the welfare state started in the interwar period and, even in Spain, despite being a latecomer to welfare policies, the first

stages of the construction of a modern welfare state started way before 1980. Moreover, the fact that the first stages of construction of modern social policies took place under an authoritarian regime makes the study of changes in the Spanish reallocation structures between the late 1950s and 1980 more interesting, as well as its comparison with the situation in current middle and low-income countries. Similarly, while the Spanish demographic transition was very advanced by 1980, 20 years before the birth rate was very high, still typical of a low-income country. The radical and quick demographic change and the rapid surge in social expenditure under the Francoist dictatorship and the democratic transition necessarily transformed the system of intergenerational transfers. A very long-term analysis of NTA in a country like Spain might therefore provide interesting insights on the dynamics of the generational economy over the process of economic development. This is why we decided to complement the NTA estimates for 1980/81-2012 with some very preliminary and necessarily lower-quality calculations for the previous decades. The following paragraphs describe the alternative techniques we have used to provide those early NTA.

Although there is no equivalent to the most detailed HBS for the period before 1980, it is possible to obtain a large amount of data from different sources, such as population censuses, government accounts and other statistical publications. The quality of this information decreases with time, but there is enough data for the second half of the 20th century to estimate some crude NTA going back at least to the late 1950s, when the standard systems of national accounts started being applied to the Spanish economy. More specifically, we have carried out NTA estimates for the years 1958, 1963 and 1973. The choice of those three dates responds to different reasons. First, 1958 represents the moment in which the modern system of national accounts was adopted in Spain. Then, 1963 is the year when the Social Security law was passed, which established the first modern Social Security system in the country. And, finally, 1973 is

the end of the period of accelerated economic growth of the so-called "Spanish miracle" and the beginning of the oil crisis.

As described above, the main component of NTA is the life cycle deficit, which is estimated as the difference, for each age group, between (public and private) consumption and labour income. For those three years we can obtain aggregate figures of public and private consumption and labour income, which are available in the Spanish official national accounts. These amounts must then be distributed among age groups. We can estimate the size of each age group in those years based on the Spanish population censuses of 1950, 1960, 1970 and 1981, which provide the distribution of the Spanish total population by each year of age. In order to obtain the age group sizes for the years under study we have applied a geometric interpolation.[13]

We have distributed public consumption by age using different procedures. First, the age distribution of the consumption of public education is based on data on public expenditure per educational levels (Instituto de Estudios Fiscales, 1976), which are then assigned to the age groups corresponding to each level. For expenditure in health and poor relief we have distributed the total spending figures (taken from Espuelas, 2013) among age groups by taking into account the relative size of the different health and poor relief institutions that were specialized in specific age groups, such as mothers, children or the elderly. This information is available in the *Spanish Statistical Yearbooks*). Other public spending has been distributed according to the standard NTA assumptions.[14]

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[13] We have corrected the age group sizes resulting from that geometric interpolation so that their sum coincides with the actual total Spanish population in each year, taken from Nicolau (2005).
[14] Public expenditure on broad non-age-related areas such as defence and infrastructural projects are assumed to be shared equally among all individuals in society (United Nations, 2013).

In the case of labour income and private consumption, there is unfortunately no systematic information on distribution by age. In the absence of data on age profiles, we decided to apply a shortcut strategy. More specifically, we assume that the age profiles of those two variables in each country depend on both the level of development (approached through income per capita) and some idiosyncratic features of the country under consideration. Based on this assumption, in the case of Spain between 1958 and 1973 we suggest that we may approach the impact of the country's level of development by looking at the age profiles of other countries for which NTA estimates are available and which at the time of the NTA estimation had a similar income per capita to Spain in 1958, 1963 or 1973. As for the specific idiosyncratic features of the Spanish case, the main source of information would be the Spanish age profiles of labour income and private consumption in 1980. However, these profiles would become less representative of the characteristics of the Spanish society as we go back in time.

Therefore, in this estimation we have assumed that the age profiles of both variables in Spain between 1958 and 1973 may be approached by a weighted average of: i) the average profile of a sample of countries with similar income per capita to Spain in the year under study; and ii) the Spanish age profile of 1980. In addition, we assume that the weight of the latter would decrease in earlier years, from 68% in 1973 to 23% in 1963 and 0% in 1958. In other words, for the first year under study (1958), the age profiles of both variables follow the same pattern to an average of countries whose income per capita at the time of the NTA estimation was similar to the Spanish one in that year, while for the other two years this has been averaged with the 1980 Spanish age profiles. The sample of countries we have used for each year estimation depends on the availability of information in the NTA project website.[15] However, the broad picture is not affected by changes in the weights or the sample used.

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[15] For 1958 these countries were, in the case of labour income: China (2002), Indonesia (2005), Jamaica (2002), Laos (2012), Nigeria (2009, 2016), Paraguay (2012), Philippines (2000, 2004, 2005, 2007, 2011, 2015) and

Moreover, we have also distributed by age all public social transfers in cash (old-age pensions, survival, disability, sickness, family allowances and unemployment benefits)[16] according to their nature and the age distribution of the potential beneficiary group. Finally, we have also carried out a very preliminary age distribution of indirect taxes (based on the distribution of private consumption) and direct taxes and social contributions (following the age structure of labour income). This way, we have been able to trace the age profiles of (positive and negative) public transfers.

Unfortunately, before 1980 there is not enough information to identify the components of asset-based reallocation and family transfers. Therefore, while for 1980 onwards we can differentiate between the three NTA reallocation mechanisms, before 1980 we can only distinguish the role of net public transfers from the other (private-based) reallocation devices.

5. The evolution of Spanish NTA, 1958-2012

Figures 1 to 4 show the average per capita age profiles of the lifecycle deficit and its components (labour income and consumption) in Spain for seven different benchmarks: 1958, 1963, 1973, 1980-81, 1990-91, 2000 and 2012. All data are in euros of 2012.

Vietnam (2008). In the case of private consumption, we used the same sample excluding China (2002) and adding El Salvador (2010) and Eswatini (2011). These countries had an income per capita that was between 0.78 and 1.43 times as high as the Spanish one in 1958 (5,176 international US$ of 1990), according to the Maddison Project Database. The sample for labour income in 1963 was: China (2002), Costa Rica (1991), El Salvador (2010), Eswatini (2011), Indonesia (2005), Jamaica (2002), Laos (2012), Nigeria (2016), Paraguay (2012) and Philippines (2004, 2005, 2007, 2011, 2015). In the case of private consumption, we used the same sample excluding China (2002) and adding China (2009), Namibia (2012) and Peru (2007). The GDP per capita of those countries was between 0.69 and 1.32 times as high as the Spanish one in 1963 (6,639 international US$ of 1990). For 1973, the sample for labour income was: Botswana (2010), Brazil (1996, 2002), China (2014), Colombia (2008, 2014), Costa Rica (2004, 2013), Gabon (2005), Hungary (1995), Mongolia (2014), Peru (2014), South Africa (2005), Thailand (1996, 2004). In the case of private consumption, we used the same sample excluding Brazil (1996), Costa Rica (2013) and South Africa (2005) and adding Hungary (2000) and Uruguay (2006). These countries had a GDP per capita between 0.81 and 1.13 times as high as the Spanish one in 1973 (11,638 international US$ of 1990).

[16] Information taken from Espuelas (2013).

Labour income profiles (Figure 1) have the typical inverted U-shape, with income concentrated around ages 25-60. The historical evolution of this profile in Spain shows interesting trends. First, the movement upwards observed between 1958 and 2000 is a reflection of the growth of the Spanish economy during that period. Per capita GDP was almost 5 times as high in 2000 as in 1958 (Prados de la Escosura, 2017). As is reflected in the figure, growth was especially intense during the 1960s and slowed down since 1975. Then, once the crisis of the late 1970s and early 1980s was overcome, economic growth was sustained until 2007. By contrast, the comparison between 2000 and 2012 shows the dramatic impact of the Great Recession.[17] The virtual stagnation of income per capita, together with increasing inequality and unemployment, explain the decrease in labour income for most age groups, but especially for workers younger than 50.

As NTA profiles are obtained in per capita terms, it is difficult to know the exact role of, on the one hand, the activity and unemployment rates and, on the other hand, the level of wages, in the shift to the right observed in the labour income profile between 2000 and 2012. However, we can use some available information to interpret that movement. First, according to INE data, unemployment rates skyrocketed during the crisis, hitting particularly the youngest (below 26): their unemployment rate reached its maximum level (57%) at the beginning of 2013, while it had only been 23% 10 years earlier (www.ine.es). Older workers (55+), however, coped better with the crisis, as their unemployment rate never surpassed 20%. Even more interesting, the age structure of the working population changed significantly: in 2007, just before the Great Recession, 24% of the working population were younger than 30, 56% were between 30 and 49 and 20% were 50 and older. By 2012, the participation of the youngest had dramatically

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[17] See Solé et al. (2012) for a more detailed discussion on the effects of the Great Recession in Spain using NTA

decreased to 15%, while it had increased for ages 30-49 (60%) and, especially, for those aged 50 and older (26%).

Figure 1. Labour income per capita by age, 1958-2012 (euros of 2012)
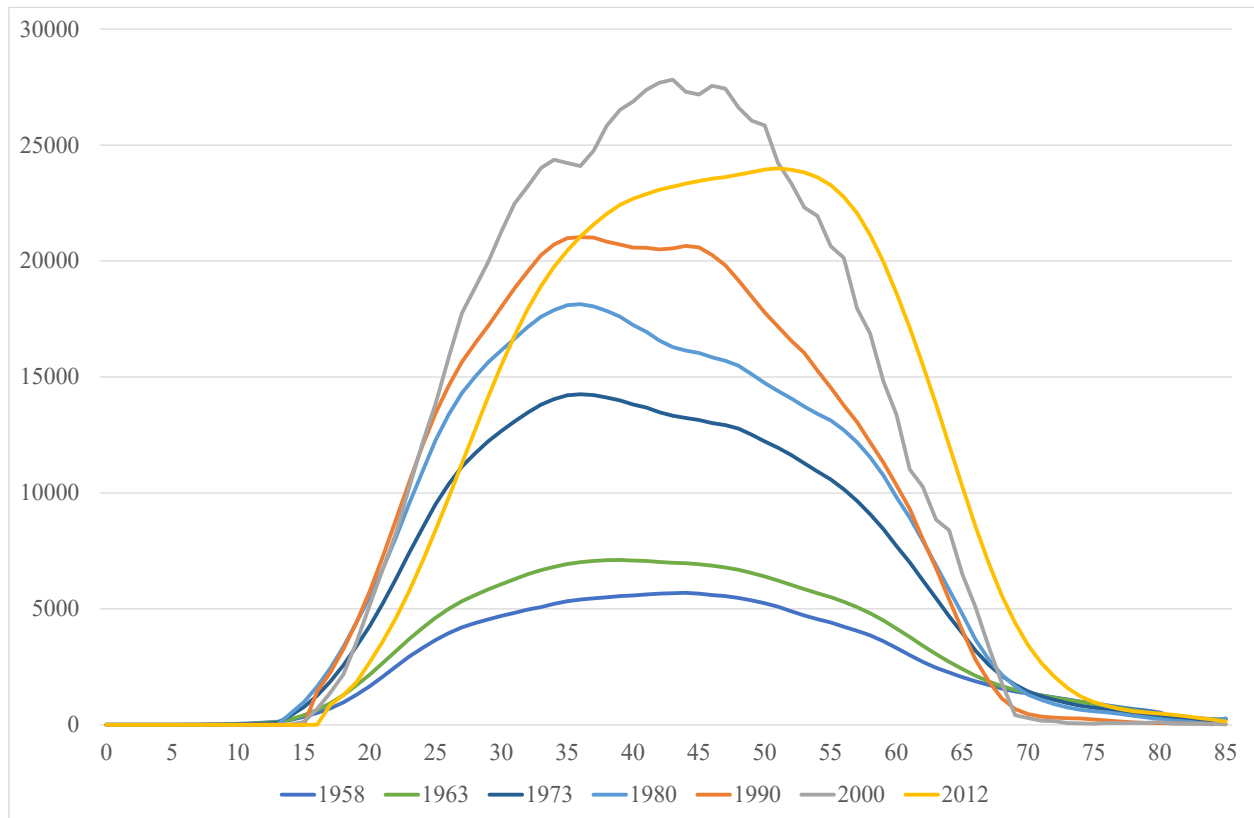
Source: see text.

Nevertheless, this latter increase took place mainly in the 50-59 age group. If we focus on the group of people that were 60 and older, changes were relatively small, since the participation of workers in that age group only increased from 4.3 to 5.3% of the total working population between 2007 and 2012. Consequently, the increase in the average labour income of people older than 60 would be mainly explained by an increase in average wages for those ages. INE only provides average wage data for the broad age group of 55 and older, but the comparison with other age groups confirms that intuition: between 2007 and 2012, the average nominal wage for workers under 25 decreased by 9%, while it increased for the rest of age groups (by

6%, 11% and 10% for those of ages 25-34, 35-44 and 45-54, respectively) and particularly for those aged 55 and older (13%).

In the case of the consumption age profile, the main theoretical framework that helps to predict its shape is the lifecycle hypothesis (Modigliani and Brumberg, 1954). It assumes that people maximize their intertemporal utility by smoothing their consumption over their lives: borrowing during childhood, saving during their working period and dissaving after retirement. According to the pure lifecycle hypothesis, age profiles of consumption should be flat along the lifecycle. However, other factors such as liquidity constraints, myopia or the bequest motive could affect the smoothing process, generating bumps in the consumption age profile.[18]

The NTA framework represented a breakthrough in empirical studies about consumption. Previously, most estimations of consumption profiles referred to households, rather than to individual consumption. Tung (2011) presented the first cross-country comparison of individual consumption age-profiles, using NTA data for 23 different countries around the world (Spain included). According to that study, and leaving aside differences in level, some features observed in the cross-country comparison become particularly interesting. Consumption grows along childhood in every country, reaching a maximum around ages 18-20 in most cases. Then, it tends to remain more or less stable along the working-age period (ages 20-60). The pattern for older ages is, however, more heterogeneous, and Tung's sample countries can be classified into three different groups. The first is composed of those countries where the age profile declines after the retirement age, something that is only observed in South Korea, Mexico and Nigeria. In those three cases, the decline is moderate, and for Mexico and Nigeria it occurs only at very old ages (80+). Second, in a much more numerous group of countries consumption remains more or less stable along the retirement period. This group of

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[18] See Deaton (1992) or Attanasio (1999) for a review about different factors affecting the lifecycle hypothesis.

countries includes, among others, Taiwan, Hungary, Chile, India, Austria, Slovenia and Spain. Finally, in a third group of countries it is possible to observe an increasing trend in the consumption levels of the elderly, which can be moderate (US, Germany, Brazil, Japan) or explosive (Sweden for ages of 70 and older or Finland for ages of 80 and older). In this third group of countries, the increase in the older age profile always has public consumption as the main explanation. That is, in those countries the goods that are publicly provided and addressed to the elderly (mainly health and long-term care), become more and more important in the total consumption for those ages, while private consumption decreases.

Figure 2. Consumption per capita by age, 1958-2012 (euros of 2012)
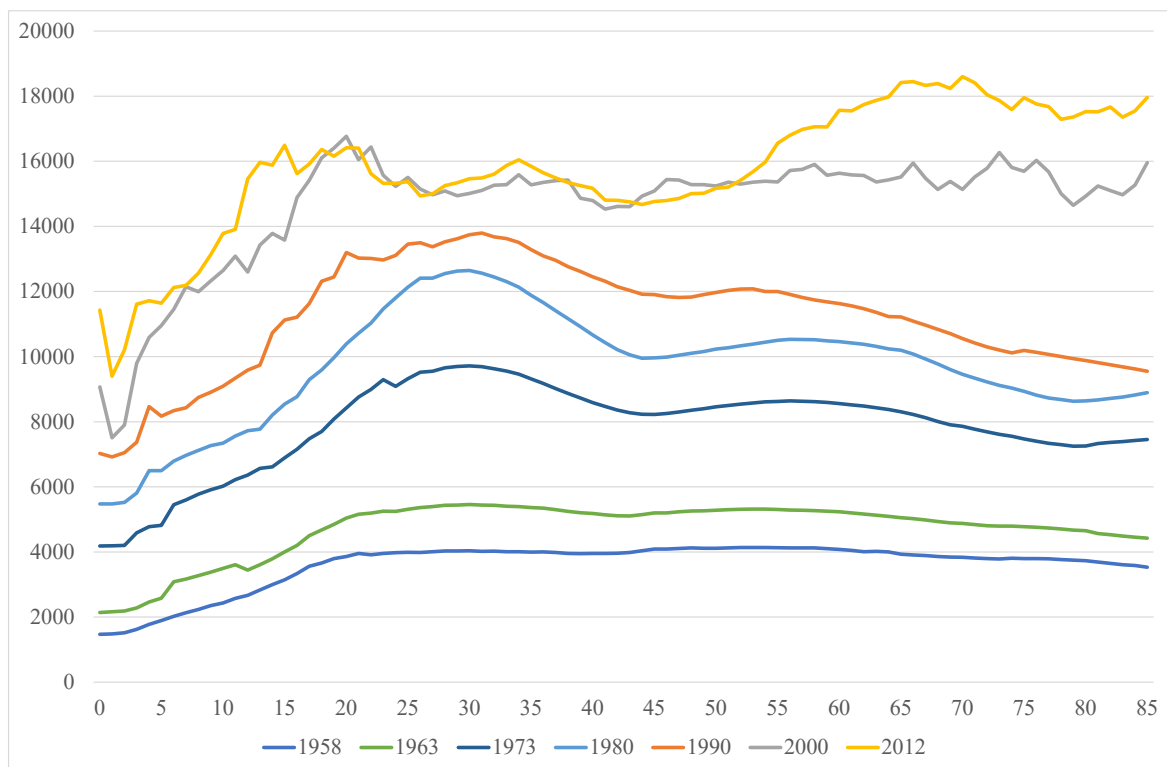
The cross-country comparison made by Tung (2011) is very useful to analyse the evolution of Spanish consumption profiles along the last decades, which are shown in Figures 2 and 3. Figure 2 reflects two main changes in the Spanish consumption profiles during the period under analysis. First, similar to labour income, consumption per capita tended to increase over time

in all ages, although growth was especially intense in the 1960s, 1980s and 1990s. Second, there was a gradual change in the shape of the consumption age profiles. While until 1990 consumption per capita first increased with age and then decreased, by 2000 the pattern of consumption became flat for people older than 20. Finally, by 2012 the highest levels of consumption per capita were to be found in people older than 60.[19] Thus, while between 1980 and 2012 consumption per capita increased on average by 90% for people 15 and younger, it grew by 120% for people 70 and older. This trend can be partially explained by observing the components of total consumption (private and public) in Figure 3.

Figure 3 shows how public consumption was rather unimportant for all ages until 1980, due to the underdevelopment of the Spanish welfare state. From that year onwards, though, the increase in the consumption of children can be explained, to a significant extent, by the growth in public consumption (especially education), which for the youngest ages (0-5) represented more than 50% of total consumption in 2012. Similarly, public consumption (mainly healthcare) would also account for an increasing share of the elderly's total consumption. In fact, by 2000 public consumption was enough to compensate for the decreasing age profile of the elderly's private consumption. This explains the flat shape of the total consumption profile in older ages in that year. Public consumption kept growing thereafter and, in 2012, it was enough to explain the increasing profile of the elderly's total consumption. Overall, the evolution of public consumption profiles along the last decades can be interpreted as part of a modernization process, which has approached Spain to the patterns previously observed by Tung (2011) for countries with a well consolidated welfare state, such as Sweden of Finland. The evolution of the share of public consumption within the total consumption of children and the elderly can be seen with more detail in Figure 4.

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[19] This change of the Spanish consumption age profile, however, was not recorded in Tung (2011) yet. This explains why Spain is classified in that paper as a country with a flat consumption profile in old ages.

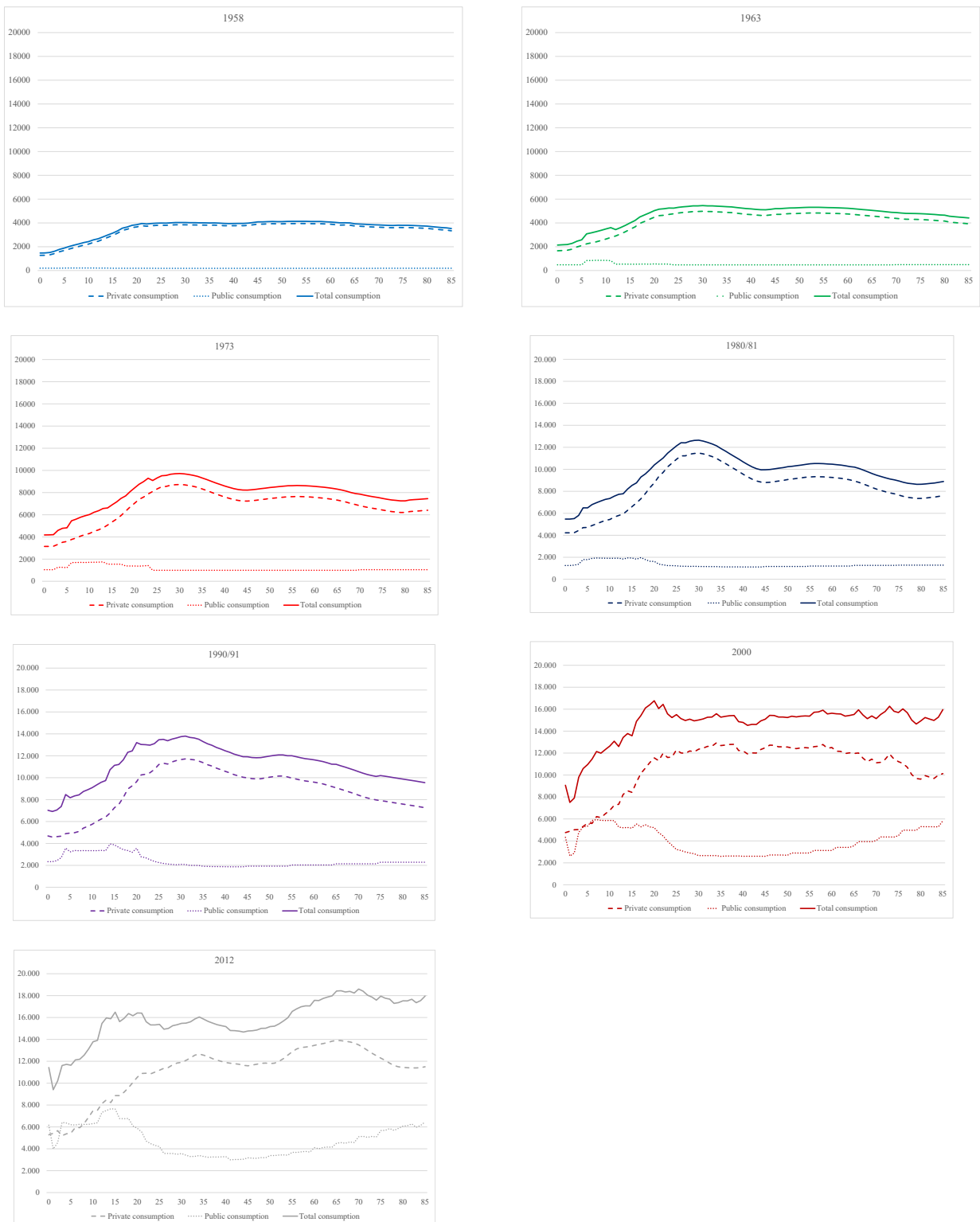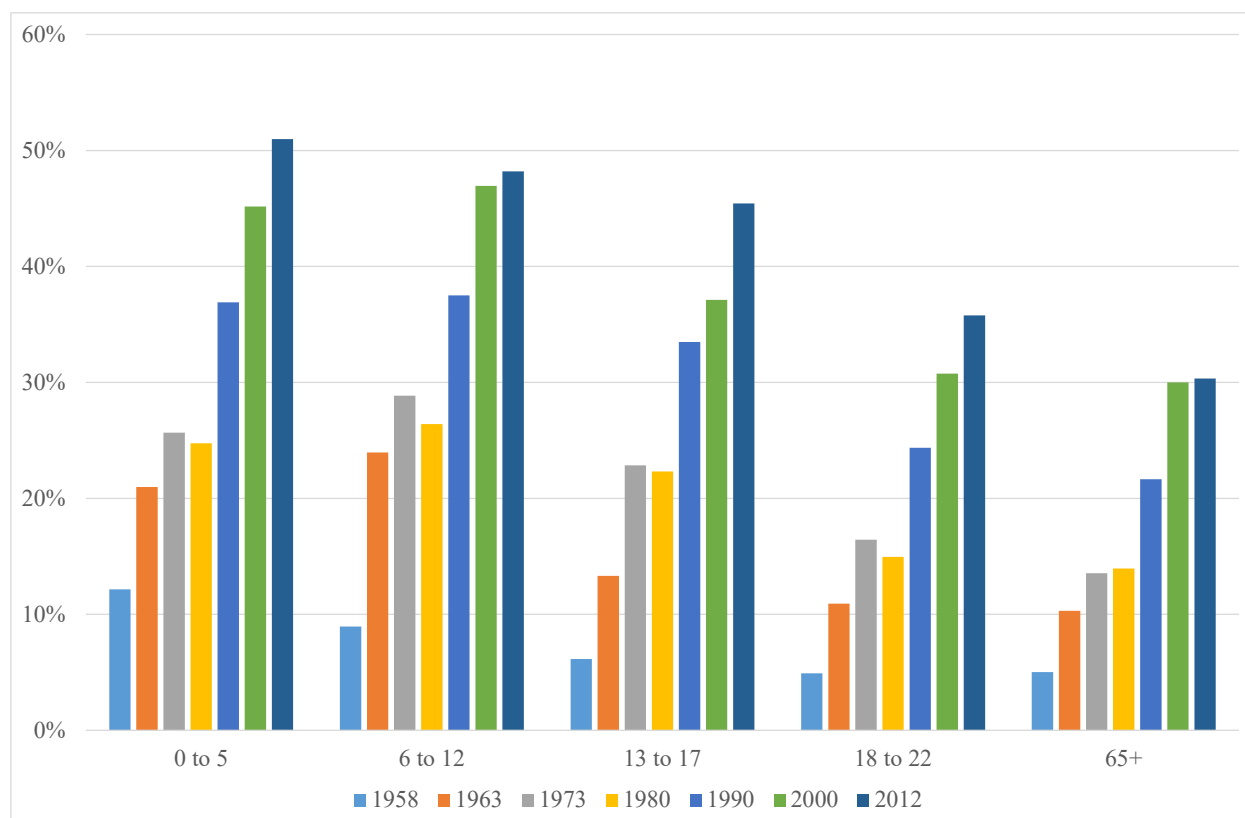**Figure 3. Public, private and total consumption per capita by age, 1958-2012 (€ of 2012)**

Figure 4. Public consumption as a share of total consumption by age groups: 1958-2012

The lifecycle deficit profiles resulting from subtracting labour income from consumption have the expected shape (Figure 5). They are positive in the extreme ages, because individual consumption exceeds labour income for children and the elderly, and they are negative during the central working age period, indicating a surplus of labour income. Interestingly, the surplus period remained relatively stable over time until 2012, when it moved to the right. The remarkable increase in the lower cut-off point between 2000 and 2012 was associated to the dramatic growth in youth unemployment that affected the Spanish economy during the Great Recession, together with the average wage evolution (as mentioned above, for ages 16-24 the nominal average wage decreased by 9% between 2007 and 2012). The same explanatory factors (unemployment and wage evolution) are behind the increase in the age at which the LCD turned positive again at older ages. In this case, they played exactly the opposite role: lower unemployment and higher wage growth for older workers delayed in two years (from 59

to 61) the age at which consumption exceeded labour income between 2000 and 2012. Figure 5 also shows a substantial increase in the size of the deficits of the youngest and oldest age groups (especially during the high growth decades of the 1960s and 1990s), which was more intense in the case of the elderly, as could be expected given the changes in the consumption age profiles described above.

Figure 5. Life cycle deficit per capita, by age, 1958-2012 (euros of 2012)
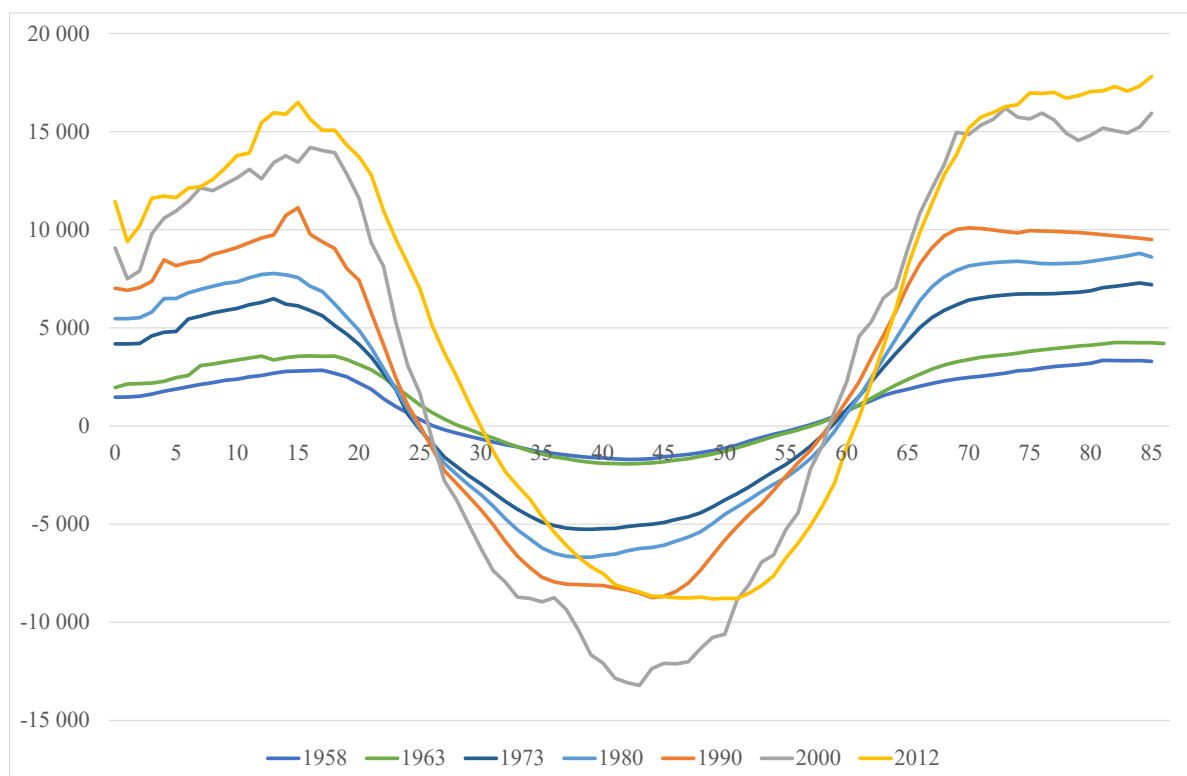
Source: see text.

Figures 6 to 8 present the ways in which those lifecycle deficits were financed. As indicated above, reallocations of resources to cover lifecycle deficits can take place in three different ways: 1) asset-based reallocations (ABR); 2) net family transfers (TF); and 3) net public transfers (TG). Due to insufficient data, we can only measure ABR and TF for the most recent period (since 1980-81). Therefore, the time span of the three figures is different: while Figure 8 (TG) covers the whole period 1958-2012, the other two figures are limited to 1980-2012.

Figure 6. Asset-based reallocations per capita by age, 1980-2012 (euros 2012)
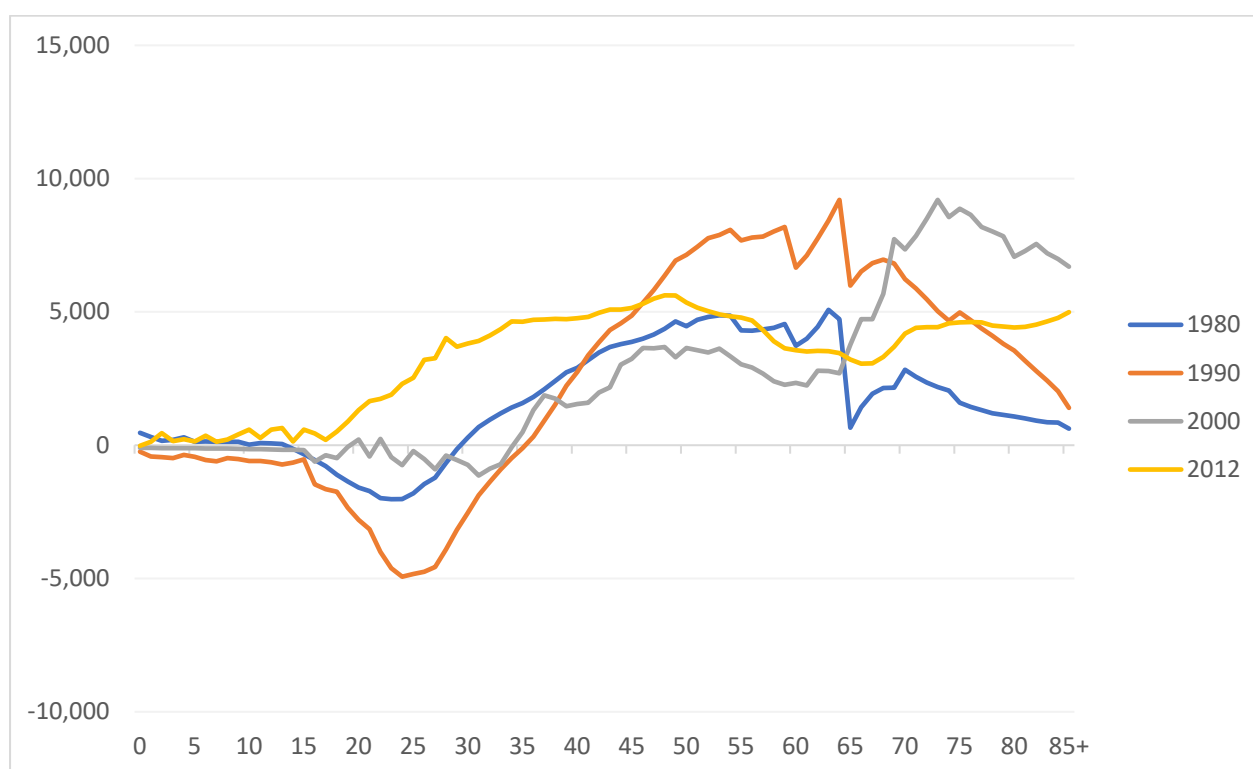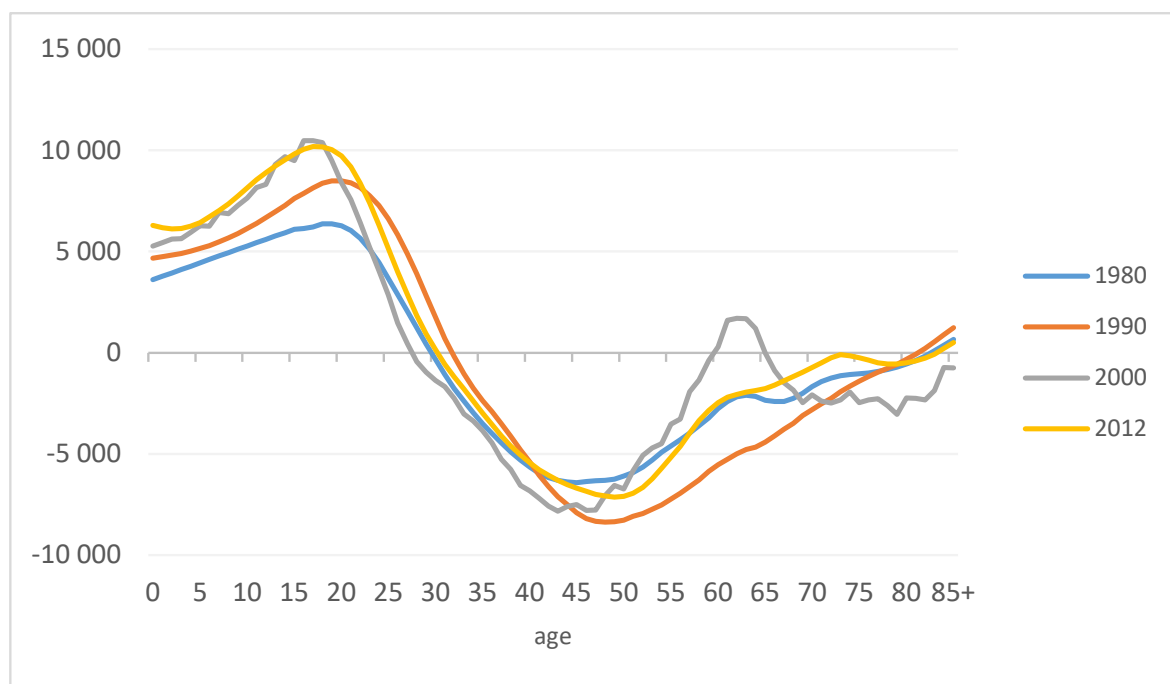

Source: see text.

As indicated before, asset-based reallocations are equivalent to the difference between asset income and savings, which include both public (imputed to households) and private savings. When they are positive, this means that individuals finance part of their consumption with asset income or using their savings. When they are negative, this means that savings net of asset income are higher than zero, and the household is accumulating wealth. ABR are nearly zero in early ages, as there are neither assets or asset income nor savings.[20] Afterwards, as individuals enter the labour market they can start saving, and ABR usually become negative and stay so as long as savings exceed asset income. Later on, when asset income becomes higher than savings (and, therefore, part of asset income is used to finance consumption), ABR become positive. We find an exception to this pattern in 2012, at the height of the Great

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[20] Actually, ABR is not exactly zero for children because the NTA methodology imputes a part of the public ABR to them.

Recession in Spain. In that year, the savings profile was negative for ages 16-38, indicating that people in those ages did not have the capacity to save, due to the very adverse conditions in the labour market. Therefore, the ABR profile for this year is always positive, as shown in Figure 6. On the other hand, regarding older ages, in 1980 the relevance of ABR as a source of funding the lifecycle deficit decreased quite rapidly with age. By 1990, a higher saving capacity during working ages increased the role of ABR for ages 45 and older, but we observe the same declining trend in older ages. However, by 2000 ABR had become a very important source of consumption funding for the elderly (65+) and remained so, although to a lesser extent, during the Great Recession.

Figure 7. Net private transfers per capita by age, 1980-2012 (euros 2012)
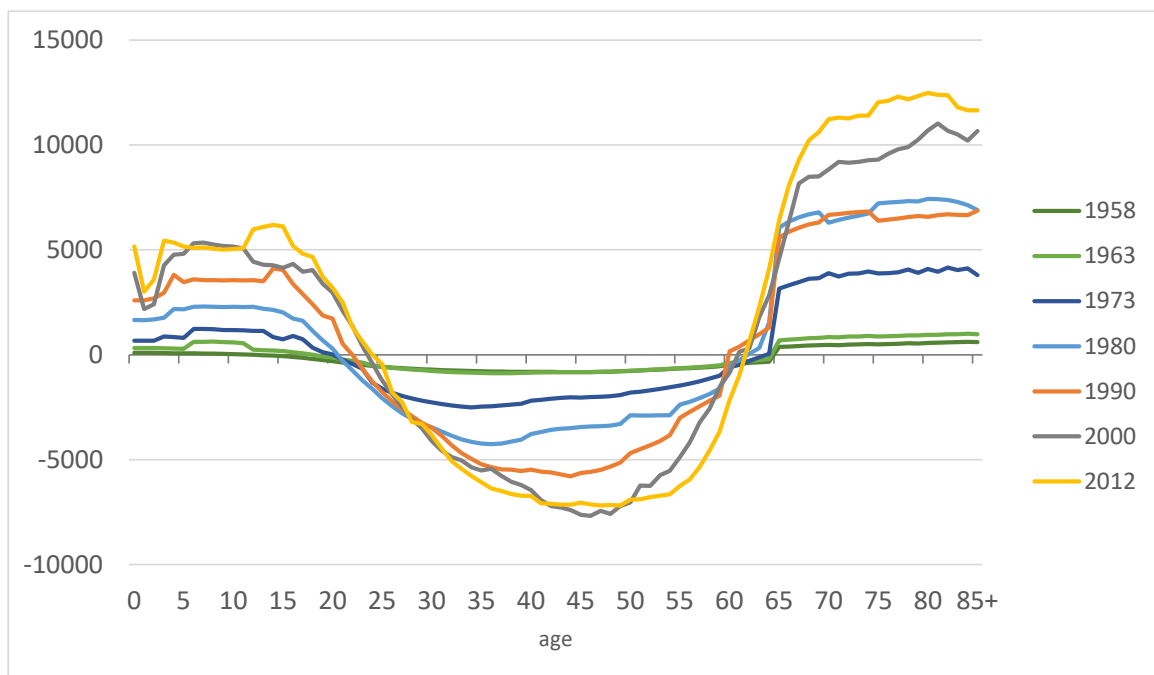

Source: see text.

Once capital income and dissaving are accounted for, the remaining deficit is covered by public and private transfers, the latter mainly intrahousehold. Private transfers (Figure 7) are essential for children and they have become more important over time, covering a significant part of the increase in the lifecycle deficit under the age of 20 that took place between 1980 and 2012. By

contrast, they have always remained rather unimportant for the elderly, who have relied much more on asset income, dissaving and, increasingly, on public transfers to finance their consumption deficit. In fact, Figure 7 indicates that private transfers for the elderly tended to be negative throughout the whole period under analysis, with the exception of very old ages (80+) in 1980 and 1990. This means that the elderly were helping to finance the deficit of younger age family members, like children or even adults without enough resources.

Figure 8. Net government transfers per capita by age, 1958-2012 (euros 2012)
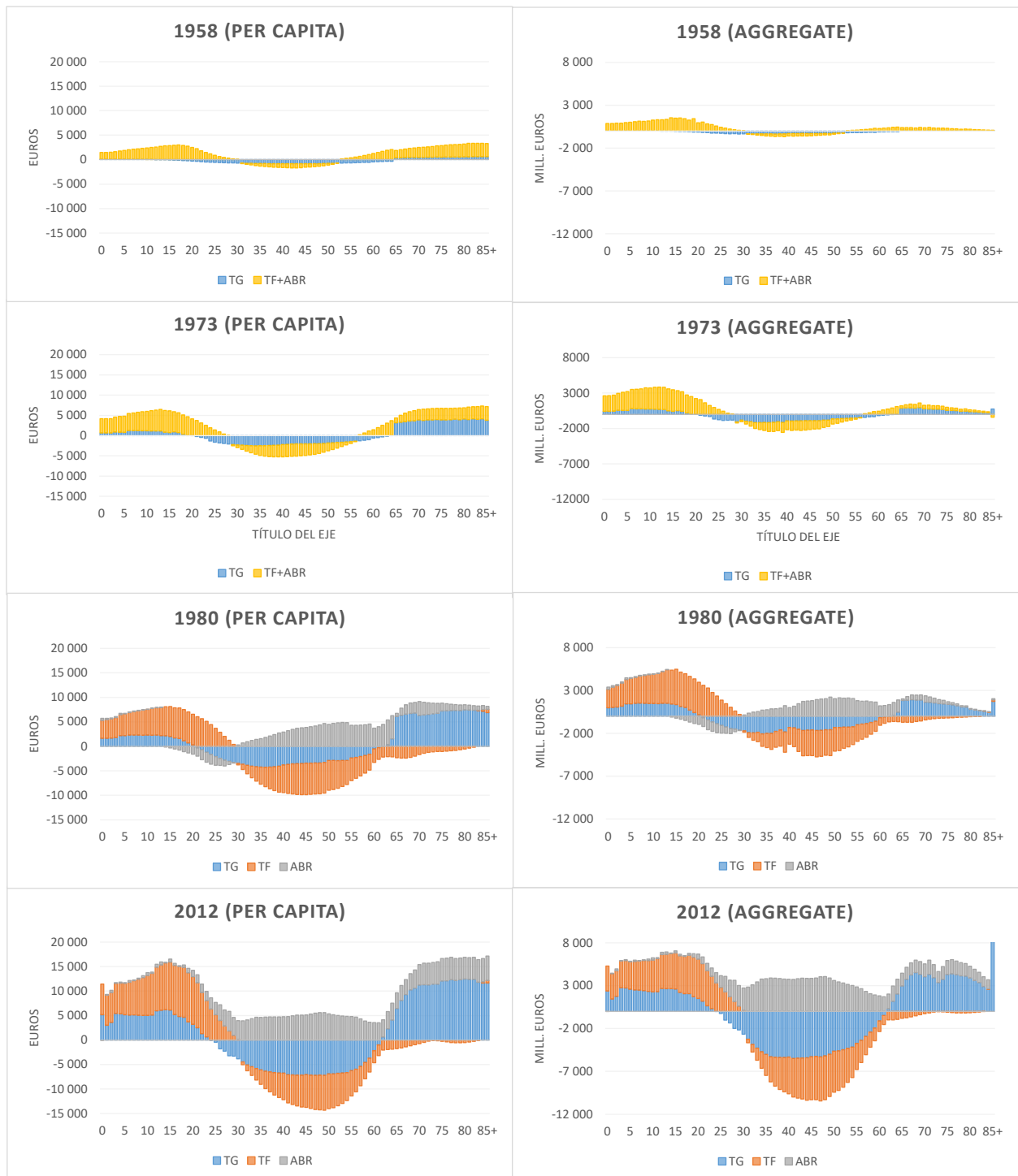

Source: see text.

The age profile of public transfers (Figure 8) has the expected shape, being negative in the working age period, when individuals contribute in net terms to the public budget, and becoming positive for both children and the elderly, as a consequence of their economic dependence. TG profiles also show the long-term process of consolidation of the Spanish welfare state. By 1958, the TG profile was extremely flat, reflecting very little intergenerational distribution through the public sector. Also, the age at which public transfers became negative was relatively low, which is consistent with such underdevelopment of the welfare state, and

with the early age at which young workers entered the labour market. Then, from 1963 onwards there has been a constant growth of intergenerational public transfers, illustrating the gradual construction of an extensive welfare state. Moreover, this consolidation was accompanied by a clear orientation of government efforts towards guaranteeing old age individuals' welfare to a much larger extent than to cover children's consumption needs. This is a general pattern observed in most developed countries, as pointed out by Solé et al. (2019): while the consumption needs of the elderly have been mostly socialized (shared by the whole society) through welfare state programs as retirement pensions and health, children depend mostly on the effort of their families. This imbalance of the public welfare programs in favour of the elderly is present in almost every country, even in those with robust family programs addressed to finance children's needs, such as Sweden, Finland and France. In the Southern European welfare regime, where family programs have been hardly developed, this bias is even more evident.

As a consequence, during the whole period under study, children's LCD financing has mainly relied on family transfers, although their importance has decreased over time, thanks to the increase in government transfers (especially education). Asset-based reallocations in the case of children have been consistently close to zero. By contrast, over time the funding of the elderly's LCD has become increasingly based on public transfers and, to a lesser extent, on asset-based reallocations. As indicated before, family transfers for the elderly have been negative and (except for 2000) rather small. In other words, the elderly have tended to be net donors of private transfers to the other age groups. To sum up, the intervention of the government on the system of intergenerational transfers in the Spanish economy has been much more generous towards the elderly throughout the period analysed, while this trend has been partially compensated by the existence of a group of old-age private transfer donors. Such government generosity towards the elderly, compared with children, might be one of the

reasons why the Spanish fertility rate has gradually reached one of the lowest values in the world.

Figure 9. The role of the three devices to finance lifecycle deficit by age (1958-2012): public transfers (TG), private transfers (TF) and asset-based reallocations (ABR)

These features can be clearly seen in Figure 9. The left panel shows the structure of the funding of LCD in Spain for each age group in 1958, 1973, 1980 and 2012, presented in per capita terms. In the right panel we present the same information but in aggregate terms (multiplied by the population of each age group). By 1958, the figure shows that the role of the public sector in intergenerational redistribution was negligible, which was consistent with the poor development of the welfare state. By 1973, however, the first signs of an incipient welfare state can be observed, both for children (as public education programs had expanded substantially) and the elderly. As has been indicated, before 1980, we cannot differentiate between asset-based reallocations and family transfers. However, in the case of children it is straightforward to assume that family transfers covered virtually their whole deficits by 1958, and most of them by 1973. By contrast, by 1980, the first period in which the full decomposition is available, we observe how family transfers were practically inexistent for the elderly, while public transfers had increased sharply, becoming the most important source to finance elderly's consumption.

Overall, the comparison between the four years represented in the figure, in per capita terms, allows observing how the development of the Spanish welfare state took off around the seventies. The figure shows again that public transfers have been much more relevant to finance the elderly's than children's LCD. Both for 1980 and 2012, the NTA estimates show that the public sector has born most of the funding of the elderly's LCD, compared with less than 50% of children's LCD. In parallel, family transfers have disappeared as a source of funding for old age groups, while they have remained essential to cover the consumption needs of the young generations, confirming a bias in the socialization of the cost of dependent age groups. This different role of the public sector in the funding of different groups' LCD can be seen more clearly in Figure 10, which compares the participation of net government transfers in the funding of both age groups' LCD. Public transfers were consistently more important for the elderly from the beginning. In the case of this group, they reached a maximum, close to 100%,

by 1980 when, by contrast, they only accounted for 29% of children's LCD. This percentage of the elderly decreased later on, thanks to the increasing importance of ABR, but the imbalance between both age groups never disappeared.

Figure 10. Participation of public transfers in the funding of children's and elderly's LCD (aggregate, %)
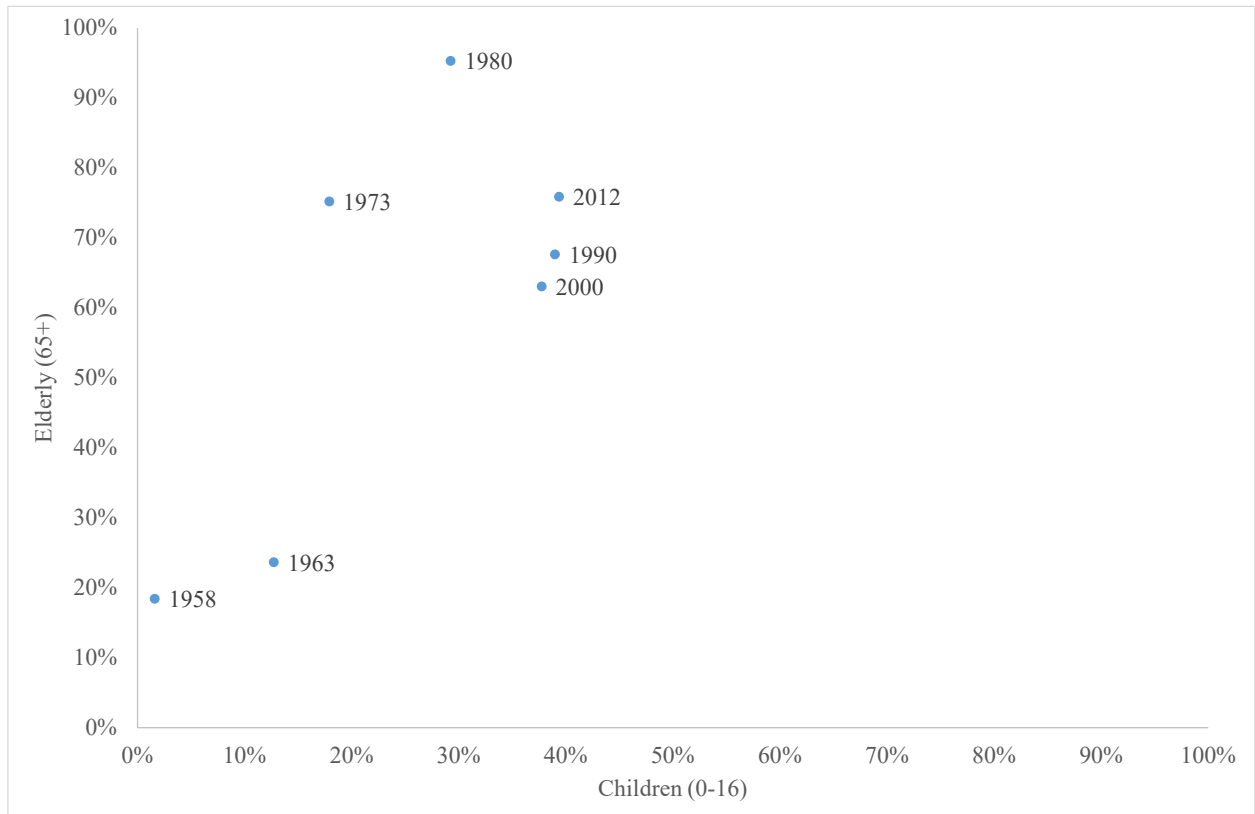
Source: see text.

Finally, the comparison of figures in per capita and aggregate terms (left and right panels, respectively, of Figure 9), allows observing the impact of the demographic transition of the Spanish population on the system of intergenerational transfers. As indicated above, by 1958, Spain was about to start a *baby boom* process, which lasted until the late 1970s, and which was preceded and followed by two profound *baby busts:* the first during the 1940s, after the end of the Civil War, and the second lasting to nowadays. These ups and downs in fertility, together with the considerable increase in life expectancy along the last decades (today, the Spanish one

is among the highest in the world) have conferred particular features to Spain's demographic pyramid. Thus, the percentage of children in total population remained very high at least until the late 1970s (with more than 25% of the population younger than 15), while the share of the elderly remained below 10%. This is clearly visible comparing the profiles for those years in per capita and in aggregate terms. In the latter, the elderly's total LCD was much smaller than the children's, representing therefore a much lower burden for the economy. In those years, and also for 1980, although per capita profiles of public transfers showed a clear bias towards the elderly, this bias almost disappeared in aggregate terms. However, the picture progressively changed with the increase in life expectancy and the aging of the baby boom generations. By 2012, the bulk of the baby boomers were in their working age, intensively paying taxes, and only 15% of the Spanish population had less than 15 years, while those over 65 were already 17%. Indeed, this partially explains the increase in the relative size of both LCD and public transfers to older ages (compared to those addressed to younger ages). Since the ageing trend will intensify in the next future (with the baby boom generation retiring from the 2020s onwards), this poses a very important threat on the sustainability of the welfare state.

6. Conclusions

NTA allow analysing how people produce, consume and save along their lifecycle, and how resources move among generations to finance the consumption deficits of the dependent groups (children and the elderly). This paper has extended the most recent Spanish NTA estimates, available for the years 2000 and 2012, back to the past until the late 1950s. In order to do this, we have provided NTA estimates for 1958, 1963, 1973, 1980 and 1990, although only those for 1980 and 1990 are based on the standard NTA methodology. By contrast, for previous periods we had to adopt a number of assumptions to obtain the NTA age profiles. While those early estimates are not comparable in quality to the most recent ones, they allow observing the

changes in the Spanish system of intergenerational transfers between the mid-20th century and the early 21st century, a period in which the country experienced intense economic growth, a profound demographic transition, deep political change and the construction of the modern welfare state.

The estimates presented above show that the Spanish generational economy of the mid-20th century was typical of a low-income country, with a rather irrelevant role of government transfers. At that time, children's consumption represented a much heavier burden for the economy than the elderly's and was mainly financed by private transfers. This situation completely changed between 1958 and 2012. During that period, public transfers grew very intensely and increased substantially their importance in the reallocation system. In addition, they were characterized by a clear bias towards financing the consumption of the elderly, covering between 70% and 100% of the LCD, compared to 20%-40% in the case of children, who kept on depending to a very large extent on family transfers. This imbalance in the welfare state made children much more vulnerable to economic crises and their effects on households' incomes, which have the potential to increase poverty rates among the younger age groups. On the other hand, from the viewpoint of public finance, the bias towards favouring the elderly was sustainable during the early stages of construction of the welfare state, due to the relatively small size of the older age groups in the last decades of the 20th century. However, today, when these groups are becoming much larger (especially due to the imminent retirement of the baby boom generation), this bias will pose a very difficult challenge for the Spanish generational economy.

7. Data availability statement

The data created come from multiple sources. First, they are a result of the exploitation of different micro data sets, some of them publicly freely available, or upon request to EUROSTAT. Second, we also employ National Account aggregates reclassified to correspond to the variables estimated in the micro data sets. Finally, we employ statistical information from the public sector. Given that these data are historical, for the initial years the information is not digitalized. All those sources are explained in the paper. Some of these estimations (year 2000) are already publicly available at the data browser of the NTA project (www.ntaccounts.org). The other years will be made publicly available in the same web browser once the publication plan for the new estimates has been completed. Additionally, as part of these data have been developed using EU funding, all the codes and external data will be made available at the end of the project publication plan at least in the UB data repository (diposit.ub.edu).

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