Methodological Note on Balance Sheets for Non-financial Assets

1. Presentation

Preparation of the Balance Sheets for Non-financial Assets by activity branch and institutional sector is required in EU Regulation No. 549/2013 of the European Parliament and of the Council of May 21, 2013[1]. The estimation of the Balance Sheets is generally carried out using the Perpetual Inventory Method[2], applied to the estimated historical series of gross fixed capital formation by asset.

The presentation of fixed capital stocks (non-financial assets produced) prepared using said method, described in the following section, allows the following basic accounting identity to be completed (SEC 2010, 7.12):

valor del *stock* de un tipo específico de activo en el balance inicial		
más	operaciones	valor total de ese activo adquirido en las operaciones que tienen lugar durante el ejercicio contable
menos		valor total de ese activo cedido en las operaciones que tienen lugar durante el ejercicio contable
menos		consumo de capital fijo
más	otras variaciones del volumen de los activos	otros incrementos del volumen que afectan a ese activo
menos		otras disminuciones del volumen que afectan a ese activo
más	revalorizaciones	valor de las ganancias de posesión nominales generadas durante el ejercicio como resultado de variaciones en el precio de ese activo
menos		valor de las pérdidas de posesión nominales generadas durante el ejercicio como resultado de variaciones en el precio de ese activo
igual al valor de los *stocks* de ese activo en el balance final.		

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[1]Tables 20 and 26 of Eurostat's Data Transmission Programme for national account data: Table 20 "Cross classification of fixed assets by activity branches and by assets" requires the elaboration of gross and net fixed capital stocks, by activity branches, at current replacement costs and replacement costs for the previous year; and table 26 "Balance of non-financial assets" requires the preparation of net fixed capital stocks and inventory of stocks by institutional sector at current prices.

[2] SEC-2010 requires this method to be used to estimate fixed capital stocks, when direct information is not available (SEC 2010, 1.24 b).

2. Calculation Method

2.1 FIXED ASSETS PRODUCED

The calculation method used in the preparation of fixed capital stocks is the Perpetual Inventory Method, PIM[3]. The method is applied to all fixed assets (non-financial non-produced assets) for the activity branches and institutional sectors, following the recommendations of the OECD manual *Measuring Capital* (2009).

The PIM is an economic-mathematical model that estimates fixed asset stocks in a given year through the accumulation of historical flows of the asset under consideration. It uses series of gross fixed capital formation by assets, activity branches and institutional sectors, with a minimum duration equal to the assets' useful life, or rather, equal to the necessary duration established by the chosen removal pattern; fundamental assumptions of the PIM that are described below. Chained price indices are also required, calculated on the basis of annual price indices for assets, which allow the historical series of gross fixed capital formation to be valued at the prices of the stock estimation year.

The PIM is fundamentally based on the assets' useful lives, their removal functions and their depreciation functions.

In the aforementioned OECD manual, the assets' useful lives are defined as the period of time that the assets are held in capital stock and during which their consumption is recorded. Normal wear and tear must be taken into account, as well as economic obsolescence and fixed asset losses as a result of accidental damages that could be insured.

The following average useful lives have been used at the most detailed level of asset work, according to the recommendations of Eurostat, the OECD and the practices of other countries.

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[3] PIM, in its acronym in English.

		Vida útil media (años)
AN.11	**Activos fijos**	
AN.111	Viviendas	60
AN.112	Otros edificios y construcciones	
AN.1121	Edificios no residenciales	40
AN.1122	Otras construcciones	55
AN.113	Maquinaria y bienes de equipo	
AN.1131	Material de transporte	
	Vehículos	10
	Barcos	24
	Trenes	22
	Aviones	25
	Otro material de transporte	10
AN.1132	Bienes de equipo TIC	
AN.11321	Material informático	5
AN.11322	Equipo de telecomunicaciones	8
AN.1139	Otra maquinaria y bienes de equipo	16
AN.114	Sistemas de armamento	
	Vehículos blindados y tanques	20
	Barcos	24
	Bienes TIC	8
	Aviones	25
	Otros sistemas de armamento	15
AN.115	Recursos biológicos cultivados	15
AN.117	Productos de propiedad intelectual	
AN.1171	Investigación y desarrollo	10
AN.1172	Prospección y evaluación minera y petrolera	15
AN.1173	Programas informáticos y bases de datos	4
AN.1174	Originales de obras recreativas, literarias o artísticas	7

The function or pattern of removal, also known as the mortality function, indicates the probability of an asset being withdrawn or discarded from the stock as a function of its average useful life. An asset is removed from the stock when it is exported, dismantled, torn down, sold as scrap or simply abandoned. Sale of an asset to continue use in production as a second-hand asset is not considered removal.

Normal removal functions truncated in the interval (0'8, 1'2) of the asset's average useful life are used. This means that in a cohort of assets, prior to 80% of the half-life, no removal occurs and, beyond its maximum life (calculated as 120% of the half-life), no asset remains in operation. Likewise, half of the assets of a cohort must have been withdrawn by the time the useful half-life is reached.

The depreciation function measures an asset's loss of economic value as it ages, as a result of wear and tear from its use in production.

Linear depreciation functions are used for all work level assets, except for the R&D asset, to which a geometric depreciation function is applied.

The linear depreciation function consists of applying a constant amount of depreciation over the asset's useful life, calculated as one between the maximum

useful life, so that the asset's market value is reduced to zero at the end of its useful life.

For the R&D asset, a geometric depreciation function is used, which consists of applying a constant annual depreciation rate throughout the asset's useful life.

Useful lives, removal functions and depreciation functions are not distinguished by activity branches or by institutional sectors.

Gross fixed capital stock is defined as the value of assets in use at the balance sheet date - that is, the value of past accumulated investments deducting only the accumulated withdrawals of assets which no longer have economic use. This measure of capital stock assumes that the asset's efficiency remains unchanged throughout its useful life.

The net stock of net capital is defined as the value, corrected for depreciation, of the assets in use at the balance sheet date.

The previously-described PIM assumptions also apply to the consistent estimate for fixed capital consumption.

The PIM is a simplified estimation method that produces results comparable and consistent with the rest of the account system information, but it is not without limitations.

- It is applied to historical series of the value of asset acquisitions, net of transfers, which is assumed to be a half and useful life for an asset of the same type produced in the same period.

- No estimate can be made for other variations in asset volumes (economic appearance or disappearance of assets, losses due to catastrophes, expropriations without compensation, classification changes, etc), which have been assumed null in the estimates of asset stocks and of fixed capital consumption derived from it.

2.2 INVENTORIES

Inventories of stocks (AN.12) for the institutional sectors of Non-financial Corporations (S.11) and Households (S.14) are estimated using the methodology described in the *Eurostat-OECD compilation guide on inventories* (2017). The main sources of data available for these sectors are the Structural Business Statistics, prepared by the INE, the Survey on the Construction Industry Structure, prepared by the Ministry of Development, and data for the Corporate Tax and the Personal Income Tax of the AEAT. Inventories of stocks have been obtained from the stocks of these sources for the year 2012 and flows of inventory variation are accumulated for the subsequent years. The estimates are then adapted to the correct valuation indicated in the SEC-2010.

Their distribution between the two sectors is estimated based on the average distribution percentages for changes in inventories (P.52) between S.11 and S.14 of the same year and the previous two years.

The inventory of stocks for the rest of the sectors is obtained through accumulation of the annual stock variation flows (P. 52).

2.3 LAND

In the case of Spain as in the case of other countries, land stocks need to be estimated by different approaches. Each one depends on the type of land in question (details of these methodologies are set out in the Eurostat-OECD compilation guide on land estimation, 2015 edition).

• Land underlying dwellings is estimated by difference between the combined value of structure and land underlying minus the net stock value in dwellings (AN.111). This combined value has been estimated by the 'Quantity times price' method, which consists of multiplying the number of existing dwellings at the end of the year by the average number of square meters per dwelling and by the average price of the square meter, also all at the end of the year.

The main sources used for estimating the number of dwellings are the Population and Housing Census, the Estimation of Housing Park by the Ministry of Development and the Intra-Census Estimation of Dwellings published by the Bank of Spain.

Estimates of the average surface for dwellings come from the results of the 2001 and 2011 Population and Housing Census with interpolation and extrapolation of these results for the intra-census, pre-census and post-census years.

The price of the square meter of the combined value (land and structure value) initially comes from the average appraised value published by the Ministry of Development from 1995 to 2006. Since 2007 and with the collaboration of General Council of the Notary, the acquisition price information contained in the contract of purchase is used. This information is also used in the elaboration of the Housing Price Index (HPI) by the NSI of Spain (INE).

The combined value (construction plus land) belonging to households and NPISHs is estimated from the percentage of real estate for residential use whose owner is a natural person or NPISHs residing in Spain, according to the Spanish Cadastral Register of Urban Real Estates.

• For land underlying other buildings and structures, the land-to-structure ratio approach has been used. This means for each year, to multiple the value of net stock in other buildings and structures (AN.112) by the estimated land-to-structure ratio for dwellings.

• Finally, for agricultural, forestry and other land, the direct stratified method has been used. This method consists of multiplying in each stratum and for each year, the number of hectares existing at the end of the year by the average price per hectare of land, also at the end of the year. The strata considered have been as follows:

− Tilled dry lands

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- Herbaceous crops
- Fruit trees
- Olive trees
- Vineyards
- Other dry lands

- Tilled dry lands
  - Herbaceous crops
  - Fruit trees
  - Olive trees
  - Vineyards
  - Other irrigated carved lands

- Permanent pastures
  - Permanent dry pastures
  - Permanent irrigation pastures
  - Other pasture surfaces
  - Permanent pastures that are no longer used for production purposes and are eligible for an aid scheme

- Other lands
  - Land with spontaneous vegetation and without agricultural or livestock use
  - Forest tree species
  - Other surfaces

The sources used for estimating the number of hectares in each stratum of land owned by Households and NPISHs have been the successive Farm Structure Survey and Agricultural Census prepared by the NSI of Spain (INE). In addition, the successive Land Price Surveys elaborated by the Ministry of Agriculture, Fisheries and Food are the sources used in estimating the price per hectare for each of the strata of land considered.

3. Dissemination

Balance sheets for non-financial assets are shown in two statistical operations of the Spanish National Accounts. On the one hand, by activity branches, in the annual National Accounts of Spain: aggregates by activity branch. And on the other, by institutional sector, in the institutional sector non-financial Yearly Accounts.

In Spain's annual National Accounts: aggregates by activity branch, the balances of non-financial assets are presented: fixed capital stocks by assets and activity

branches. And also the gross formation of fixed capital by assets and activity branches and the consumption of fixed capital by activity branches.

Gross and net fixed capital stocks are disseminated by assets and branches of activity in aggregations A*10 and A*21[4], and valued at current replacement costs and replacement costs from the previous year, from the year 2000 to the year t-2 (where t is the year of results dissemination).

Gross fixed capital formation is presented, by assets and activity branches, in aggregations A*10 and A*21 at current prices, together with chained volume indices and annual variation rates at both current and volume prices, from the year 1995 to the year t-2.

The breakdown of assets is as follows:

AN.11	Activos fijos
AN.111	Viviendas
AN.112	Otros edificios y construcciones
AN.113 + AN.114	Maquinaria y bienes de equipo + sistemas de armamento
AN.1131	Material de transporte
AN.1132	Bienes de equipo TIC
AN.1139 + AN.114	Otra maquinaria y bienes de equipo + sistemas de armamento
AN.115	Recursos biológicos cultivados
AN.117	Productos de propiedad intelectual
AN.1171	Investigación y desarrollo
AN.1173	Programas informáticos y bases de datos

Nota: AN.1132, AN.1139 + AN.114, AN.1171 y AN.1173 solo se presentan para el total de ramas de actividad.

Consumption of fixed capital is disseminated by activity branches in aggregations A*10, A*21 and A*64, at current prices, together with the chained volume indices and annual variation rates at both current and volume prices, from the year 1995 to the year t-1.

In the institutional sectors non-financial Yearly Accounts, the Balances of non-financial assets produced (fixed assets and stocks) and non-produced (land), are presented with the following breakdown:

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[4] The level of disaggregation by branches is detailed in Chapter 23 of Classifications of EU Regulation No 549/2013.

AN.11	Activos fijos
AN.111	Viviendas
AN.112	Otros edificios y construcciones
AN.113 + AN.114	Maquinaria y bienes de equipo + sistemas de armamento
AN.1131	Material de transporte
AN.1132	Bienes de equipo TIC
AN.1139 + AN.114	Otra maquinaria y bienes de equipo + sistemas de armamento
AN.115	Recursos biológicos cultivados
AN.117	Productos de propiedad intelectual
AN.1171	Investigación y desarrollo
AN.1173	Programas informáticos y bases de datos

Nota: AN.1132, AN.1139 + AN.114, AN.1171 y AN.1173 solo se presentan para el total de la economía.