Convenient policy structures for the Romanian health care system

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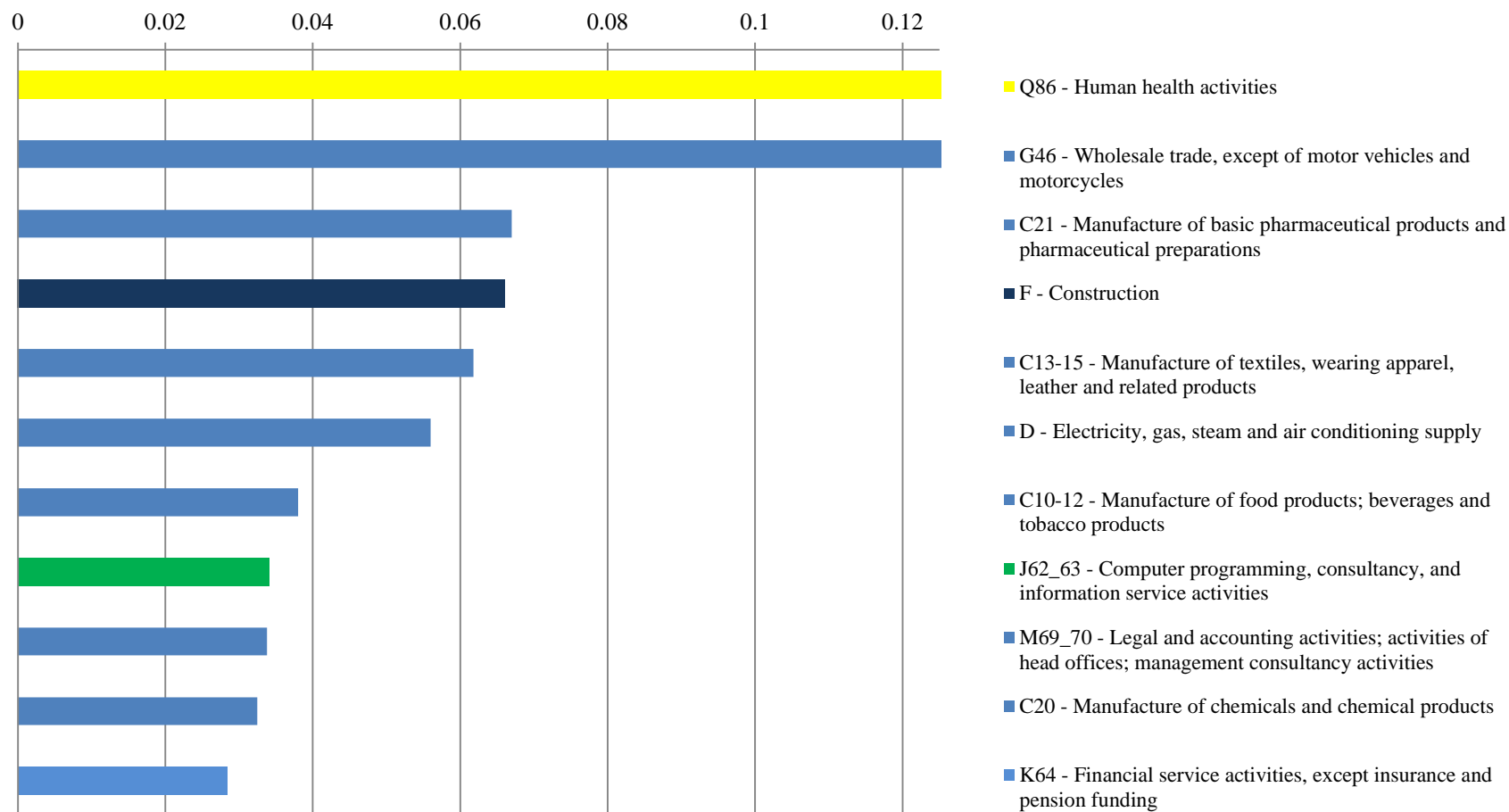AdvisEU STUDIO Project, Spin-off of University of Macerata, Italy, a.elmeligi@unimc.it

Measuring Development in Turbulent Times (Bucharest, November 28-29, 2017)

Motivations:

- Why here? To present instruments as to support the decision making process and to evaluate European programmes and National reforms;

- Why Romania? According to the WHO, Romania was the last of the EU Member States in terms of Health expenditure as share of GDP (Romania 5,14% ; EU-28 8,40%, 2014);

- Why the Health care? Health care expenditure has the potential to trigger the production of other relevant industries in an economic system, and to provide alternative indicators that measure the growth.

Human health backward linkages:

Legend:
- Q86 - Human health activities
- G46 - Wholesale trade, except of motor vehicles and motorcycles
- C21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations
- F - Construction
- C13-15 - Manufacture of textiles, wearing apparel, leather and related products
- D - Electricity, gas, steam and air conditioning supply
- C10-12 - Manufacture of food products; beverages and tobacco products
- J62_63 - Computer programming, consultancy, and information service activities
- M69_70 - Legal and accounting activities; activities of head offices; management consultancy activities
- C20 - Manufacture of chemicals and chemical products
- K64 - Financial service activities, except insurance and pension funding

Aim of our contribution:

- Provide the economic impact of the European structural policy for Romanian Health care system;

- Evaluate the ESI Funds and the national co-financing expenditure on GDP in a multisectoral framework;

- Assess the direct and indirect economic effects on the Health care system, the ICT industries and the rest of the activities.

Key arguments

- 2013 Social Accounting Matrix (SAM) for Romania;

- Dynamic extended multisectoral model;

- European Structural and Investment (ESI) Funds for the Romanian Health care System;

- Policy impact scenarios : Health care system and the ICT sector.

The 2013 SAM for Romania

- The Romanian case of study is based on a SAM framework and is created on the dataset provided by the National Institute of Statistics of Romania for the year 2013 and Eurostat;

- SAM is an accounting scheme able to provide a complete picture of the economic system and represents a starting point for static and dynamic application, considering all the phases of the circular flow of income and to link exogenous variables as the employment;

- The multisectoral scheme exploits the opportunity of a great interindustry detail to connect the sphere of production with that of the institutional sectors

- The accounting scheme provide a basic framework including: Output by industry and commodity, Intermediate consumption by commodity, Primary Factors, Institutional Sectors, Capital formation and the Rest of the World.
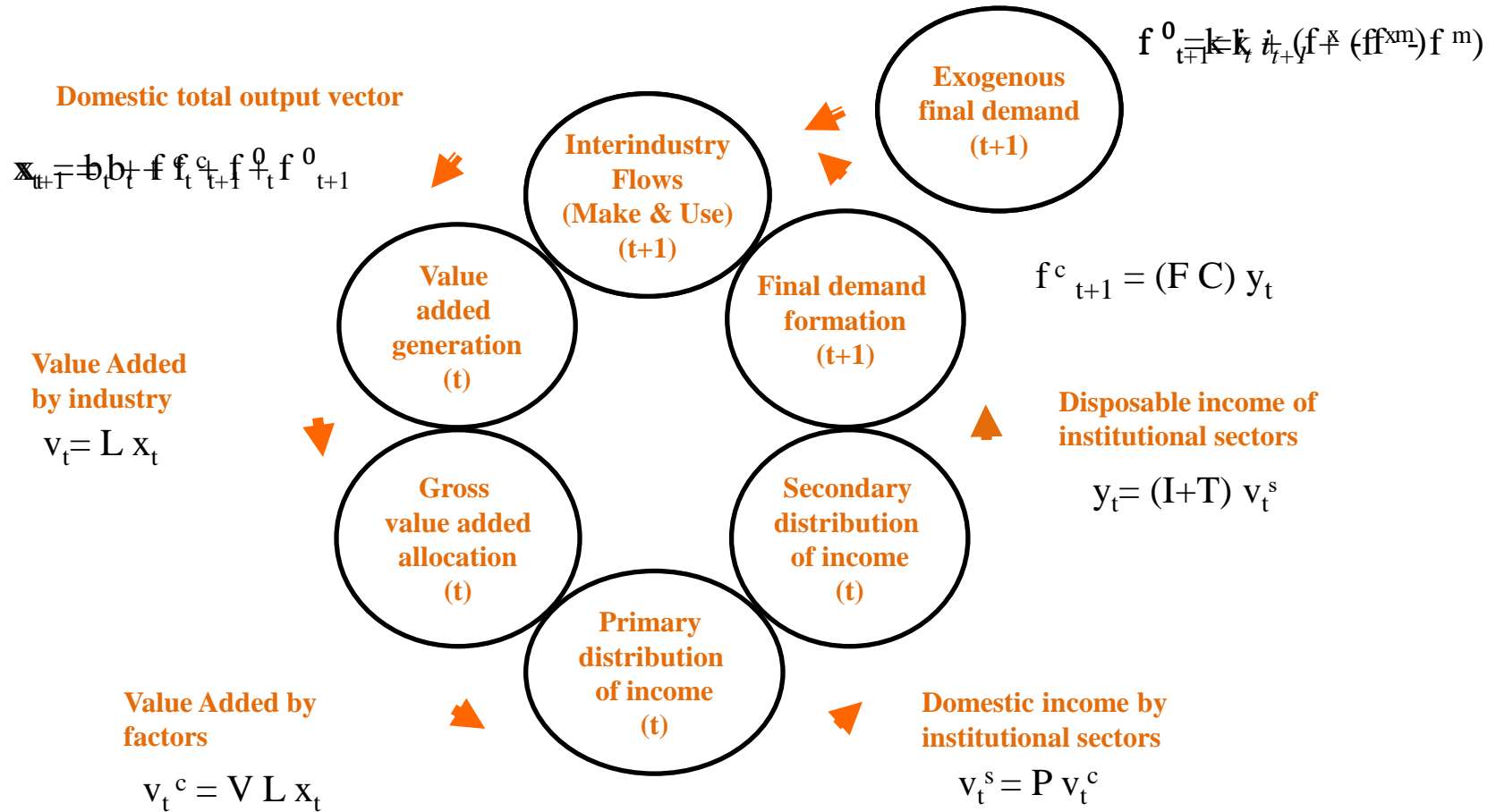
Table 1: **The 2013 SAM for Romania**

	Commodities	Industries	Gross Value Added	Taxes on products less subsidies	Institutional sectors	Capital formation	Rest of the world	TOTAL
Commodities	0	154491	0	0	102415	34424	58007	349336
Industries	290402	0	0	0	0	0	0	290402
Gross Value Added	0	127043	0	0	0	0	1196	128239
Taxes on products less subsidies	0	8868	0	0	5891	2451	0	17210
Institutional sectors	0	0	129273	17110	72113	0	6472	224968
Capital formation	0	0	0	0	35990	0	885	36875
Rest of the world	58934	0	-1034	100	8559	0	0	66559
TOTAL	349336	290402	128239	17210	224968	36875	66559	

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The 2011 SAM for Romania

- The 2013 SAM considers a framework of dimensions *145x145* with:

- 65 commodities and *65* industries;

- *5* value added components: Gross wages and Salaries, Social contributions, Gross operating surplus, Mixed income, Other taxes on production less subsidies on production;

- *1* taxes on products components: Taxes on commodities less subsidies on commodities;

- *6* institutional sectors: Households, Non - Profit Institutions Serving Households (NPISHs), Financial Corporations, Non Financial Corporations, Government and Rest of the world;

- *2* Capital formation components: Investments and Change in inventories.

Figure 1: **Dynamic multisectoral extended model**

$$f^0_{t+1} = k \cdot i_{t+1} \cdot (f^x + (f^{xm}) f^m)$$

Domestic total output vector

$$x_{t+1} = b_t + f^c_t + f^0_{t+1}$$

Exogenous final demand (t+1)

Interindustry Flows (Make & Use) (t+1)

Value added generation (t)

Final demand formation (t+1)

$$f^c_{t+1} = (F \ C) \ y_t$$

Value Added by industry

$$v_t = L \ x_t$$

Gross value added allocation (t)

Secondary distribution of income (t)

Primary distribution of income (t)

Disposable income of institutional sectors

$$y_t = (I+T) \ v_t^s$$

Value Added by factors

$$v_t^c = V \ L \ x_t$$

Domestic income by institutional sectors

$$v_t^s = P \ v_t^c$$

Dynamic multisectoral extended model

- The main equation of the model can be introduced:

$$x_t = b(x_t) + f^c (y_{t-1}) + f_t^0 \qquad (1)$$

- The vector $b(x_t)$ is equal to the intermediate consumption matrix $B[m;m]$ pre-multiplied by the output vector x_t. The $f^c(y_{t-1})$ vector introduces the endogenous final demand while f_t^0 represents the exogenous final demand.

- The above mentioned equation 1 can also be expressed in its reduced form:

$$x_t = (I- DB)^{-1} D [FC (I + T) P V L]^{-1} x_{t-1} + (I- DB)^{-1} D [k\, i_t + (f^x - f^m)] \qquad (2)$$

Dynamic multisectoral extended model

$$x_t = (I - DB)^{-1} D (f^c (y_{t-1}) + f_t^0) \tag{3}$$

- The value added coefficients can be obtained as a diagonal vector of value added-to-output ratios. In order to capture the value added impact we use:

$$va_t = L_t\, x_t \tag{4}$$

- where $\mathbf{L_t}$ is a diagonal matrix and each element represents the total capital and labour requirements by total output.

ESI Funds 2014-2020 for Health care system

- The current funding for regional and cohesion policy for 2014-2020 adds up to 351.8 billions of euro, from which Romania's share equals 30.4 billions of euro.

- In the new programming period the level of support available for member states (the maximum co-financing rates) will be 85% in less developed regions and up to 80% in more developed regions;

- We consider all the 3 Operational Programmes that funds the Health care system: Regional, Human Capital and Competitiveness with a total amount of 1,215 millions of euro (806,2 from UE and 409,5 co-financed by the Government);

- The study is developed on two scenarios which show the GDP trend based on two different assumption:
  - the total amount of the funds is spent following the time schedule of the ex-ante evaluation;
  - only the 90.2% of the total amount is spent following the existing opened and closed call, plus a projection according to the expenditure of the last five years of the previous programming period 2007-2013.

Financial allocations from UE which include health:

Programmes	Health allocation	Category:	Investment priority	Specific objective
Regional OP	€ 319 148 936	053	Health Infrastructure	Investing in health and social infrastructure which contributes to national, regional and local development, reducing inequalities in terms of health status.
Human Capital OP	€ 457 100 000	112	Enhancing access to affordable, sustainable and high-quality services, including health care and social services of general interest.	Increasing the number of people receiving health programs and services aimed at prevention, early detection (screening), early diagnosis and treatment for major diseases
Competitiveness OP	€ 30 000 000	081	ICT solutions addressing the healthy active ageing challenge and e-Health services and applications (including e-Care and ambient assisted living)	Strengthening ICT applications for e-government, e-learning, e-inclusion, e-culture and e-health
Administrative Capacity OP	€ n/a	107	Active and healthy ageing	Various activities designed to help elderly people to remain active and healthy and prevent social exclusion of elderly people are to be supported.
Total:	€ 806 248 936			

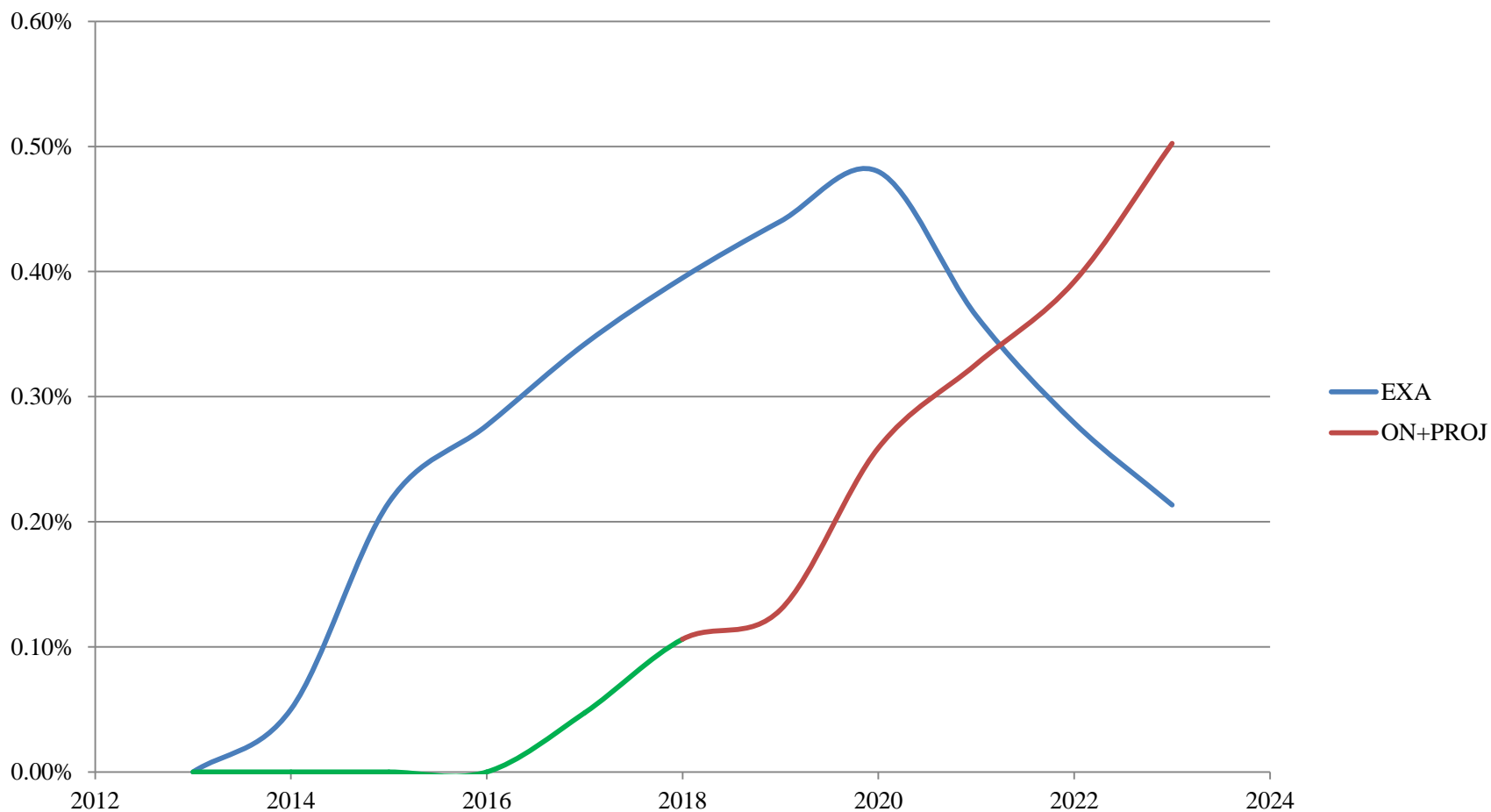Table 2: **Ex-ante estimation of the Healthcare system investments, in millions of euro**.

Operational Programmes	ESI Funds	2014	2015	2016	2017	2018	2019	2020	TOTAL
Regional OP	ERDF	0	80.8	40.7	48.1	48.6	49.8	51.2	319.1
Human Capital OP	ESF - YEI	54.5	58.4	62.5	65.8	69.0	72.0	74.9	457.1
Competitiveness OP	ERDF	4	4	4	4	5	5	5	30
Regional OP	ERDF	0	81.0	40.8	48.2	48.7	49.9	51.3	319.8
Human Capital OP	ESF - YEI	10.0	10.7	11.5	12.1	12.7	13.3	13.8	84.1
Competitiveness OP	ERDF	1	1	1	1	1	1	1	5.6
TOTAL	-	68.8	235.4	160.1	179.1	184.4	190.6	197.4	1215.8

Table 4: **Ex-post estimation of the Healthcare system investment, in millions of euro**.

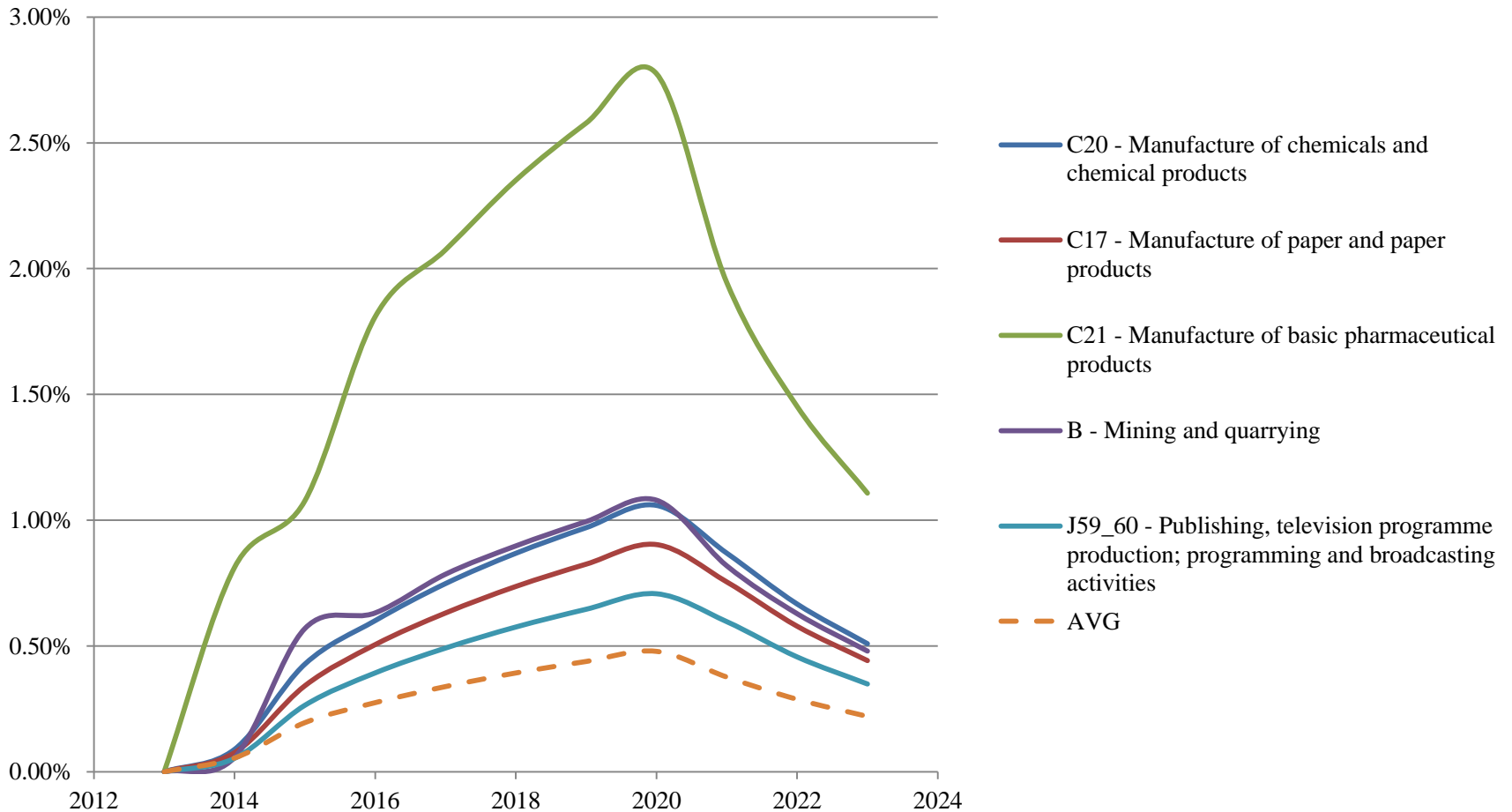| Operational Programmes	ESI Funds	2017	2018	2019	2020	2021	2022	2023	TOTAL
Regional OP	ERDF	0.0	33.0	23.5	47.4	72.9	37.2	79.5	293.6
Human Capital OP	ESF - YEI	54.7	23.6	15.5	99.7	16.5	102.8	89.1	402.0
Competitiveness OP	ERDF	0.0	0.0	2.5	5.0	7.7	3.9	8.4	27.6
Regional OP	ERDF	0.0	31.7	23.6	47.7	73.5	37.5	80.1	294.2
Human Capital OP	ESF - YEI	10.1	4.4	2.9	18.3	3.0	18.9	16.4	74.0
Competitiveness OP	ERDF	0.0	0.0	0.5	0.9	1.4	0.7	1.6	5.1
TOTAL	-	64.7	92.7	68.4	219.1	175.1	201.2	275.1	1096.4

GDP percentage variation from the benchmark

Ex-ante direct and indirect impact on the value added per sector – Percentage variation from the benchmark
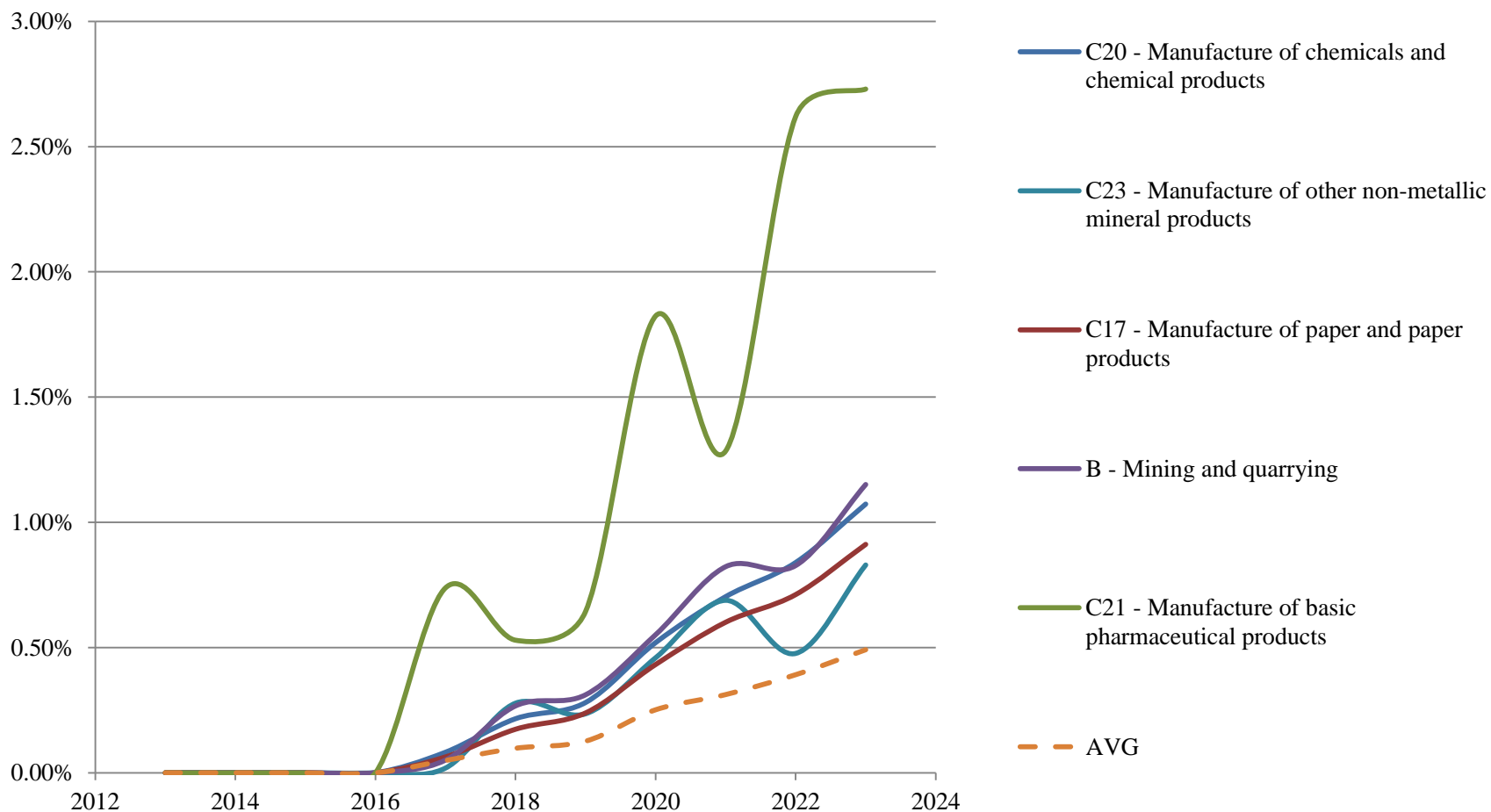
On-going + Projection direct and indirect impact on the value added per sector – Percentage variation from the benchmark


C26 - Manufacture of computer, electronic and optical products

J58 - Publishing activities

J61 - Telecommunications

J62_63 - Computer programming, consultancy, and information service activities

Q86 - Human health activities

S95 - Repair of computers and personal and household goods

F - Construction

Ex-ante direct and indirect impact on the value added per sector – Percentage variation from the benchmark

On-going + Projection direct and indirect impact on the value added per sector – Percentage variation from the benchmark

- C20 - Manufacture of chemicals and chemical products
- C23 - Manufacture of other non-metallic mineral products
- C17 - Manufacture of paper and paper products
- B - Mining and quarrying
- C21 - Manufacture of basic pharmaceutical products
- AVG
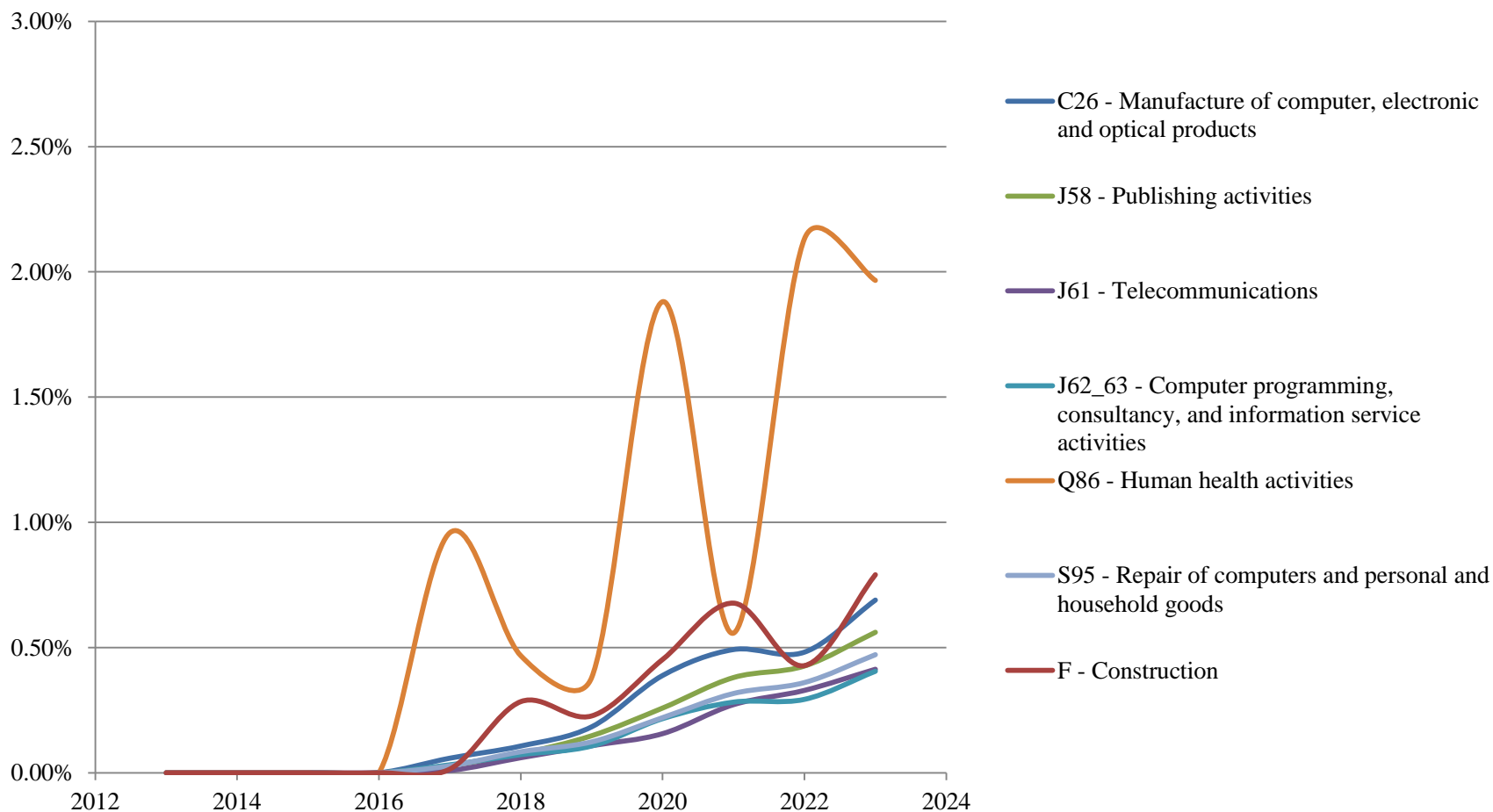
Macro Multipliers approach

- The proposed approach, the Macro Multipliers (MM) (Ciaschini and Socci, 2006; Ciaschini et al., 2009, 2010, 2011, 2013), is based on the identification of the structures of the control variable, compatible with the target set by the decomposition of the structural matrix in the reduced form of the model. In particular, the decomposition of the matrix **R** is the following:
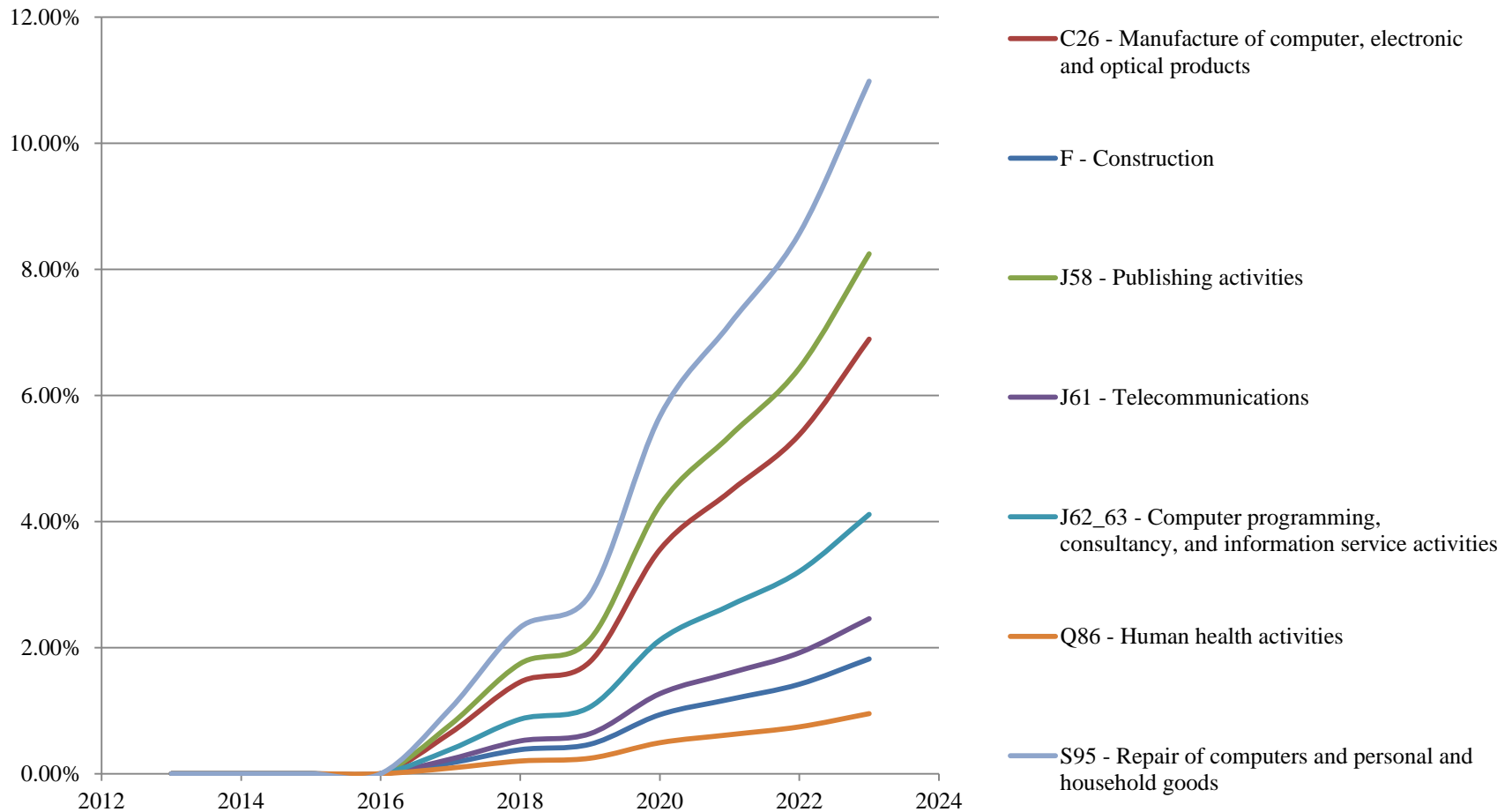
$$\mathbf{R} = \mathbf{U} \cdot \mathbf{S} \cdot \mathbf{V'} \tag{5}$$

- The right matrix ($\mathbf{V'}[m,m]$) identifies the composition of the policy control (final demand), the central matrix **S** represents the scale factors and it's composed of m singular values MM and the left matrix ($\mathbf{U}[m,m]$) identifies the structures of the policy target variable.
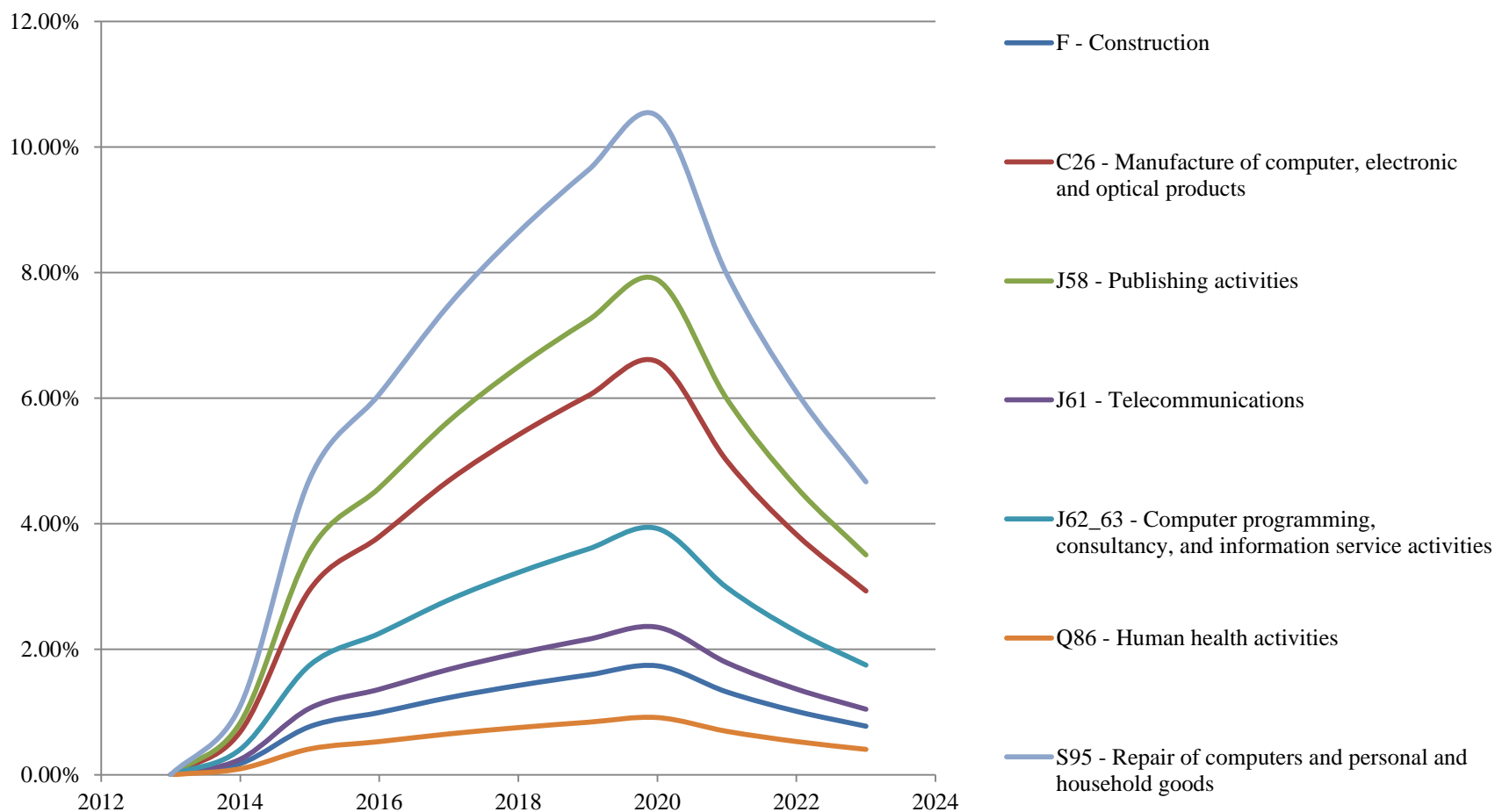
Dominant structure (1) ex-ante direct and indirect impact on the value added per sector – Percentage variation from the benchmark
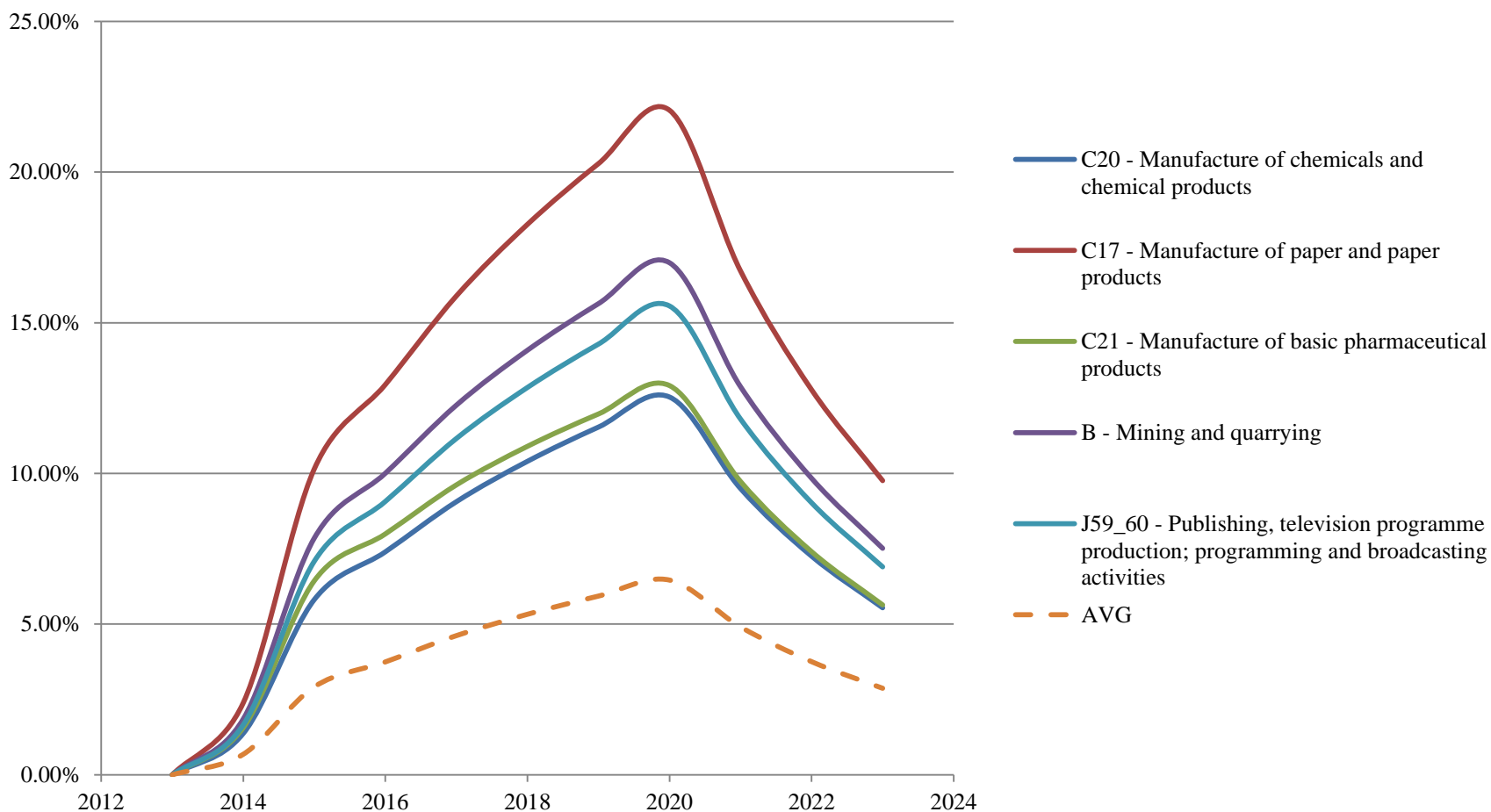
Dominant structure (1) on-going + Projection direct and indirect impact on the value added per sector – Percentage variation from the benchmark
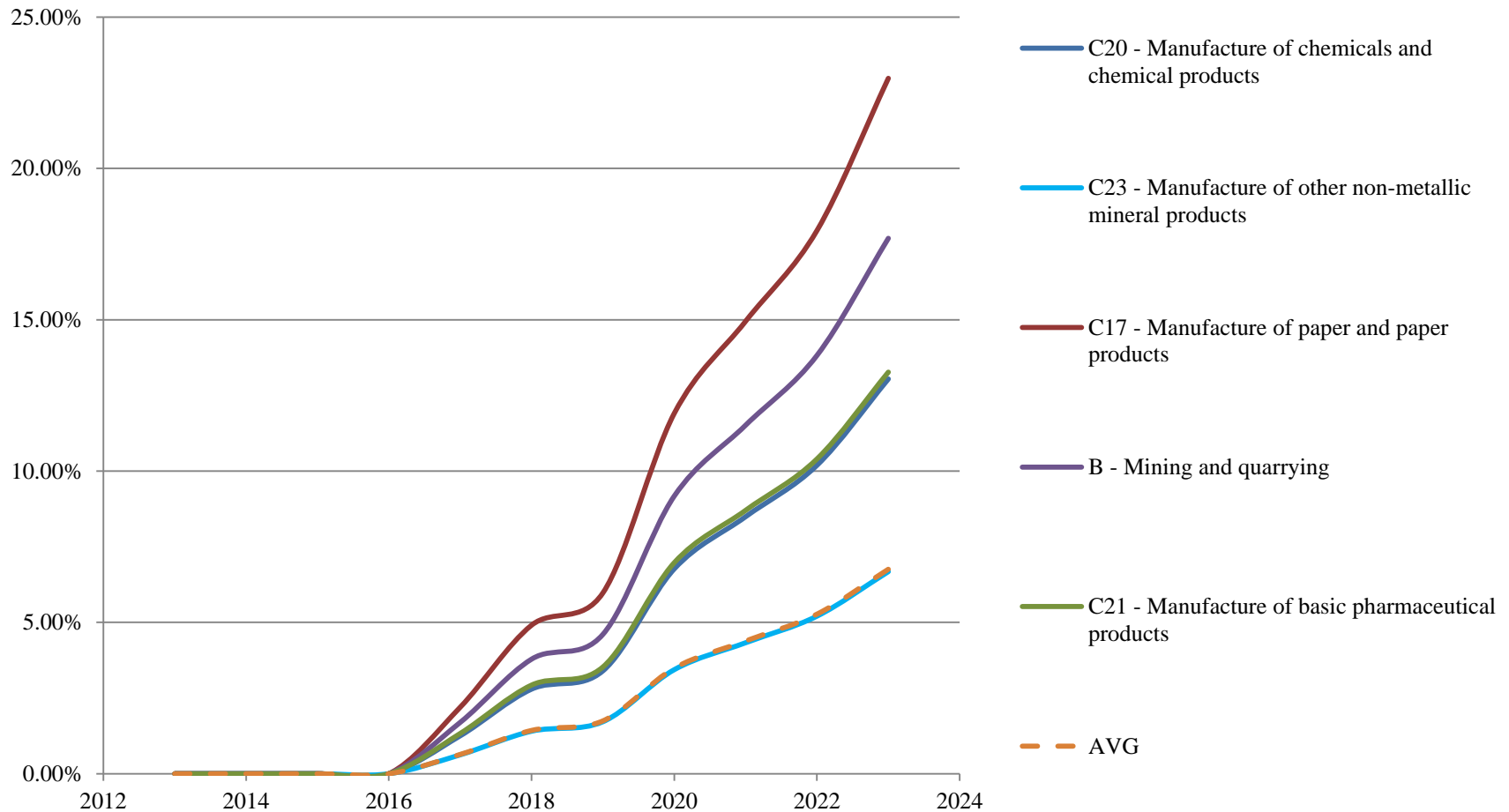

Legend:
- C26 - Manufacture of computer, electronic and optical products
- F - Construction
- J58 - Publishing activities
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Dominant structure (1) ex-ante direct and indirect impact on the value added per sector – Percentage variation from the benchmark

Legend:
- C20 - Manufacture of chemicals and chemical products
- C17 - Manufacture of paper and paper products
- C21 - Manufacture of basic pharmaceutical products
- B - Mining and quarrying
- J59_60 - Publishing, television programme production; programming and broadcasting activities
- AVG

Dominant structure (1) on-going + Projection direct and indirect impact on the value added per sector – Percentage variation from the benchmark

Remarks:

- The two hypothetical scenarios that we presented compared with the benchmark clearly underline the difference between the European intervention and the absence of this policy instrument.

- In aggregated and disaggregated terms, the results of the proposed model underline the importance of this instrument for achieving the European target and obtain a positive effect in terms of production and GDP for developing countries.

- The direct and indirect effects generated by the Health care investment contribute in stimulating the value added, the income and the employment of other sectors, such as the ICT which is one of the main targets of the current programming period.
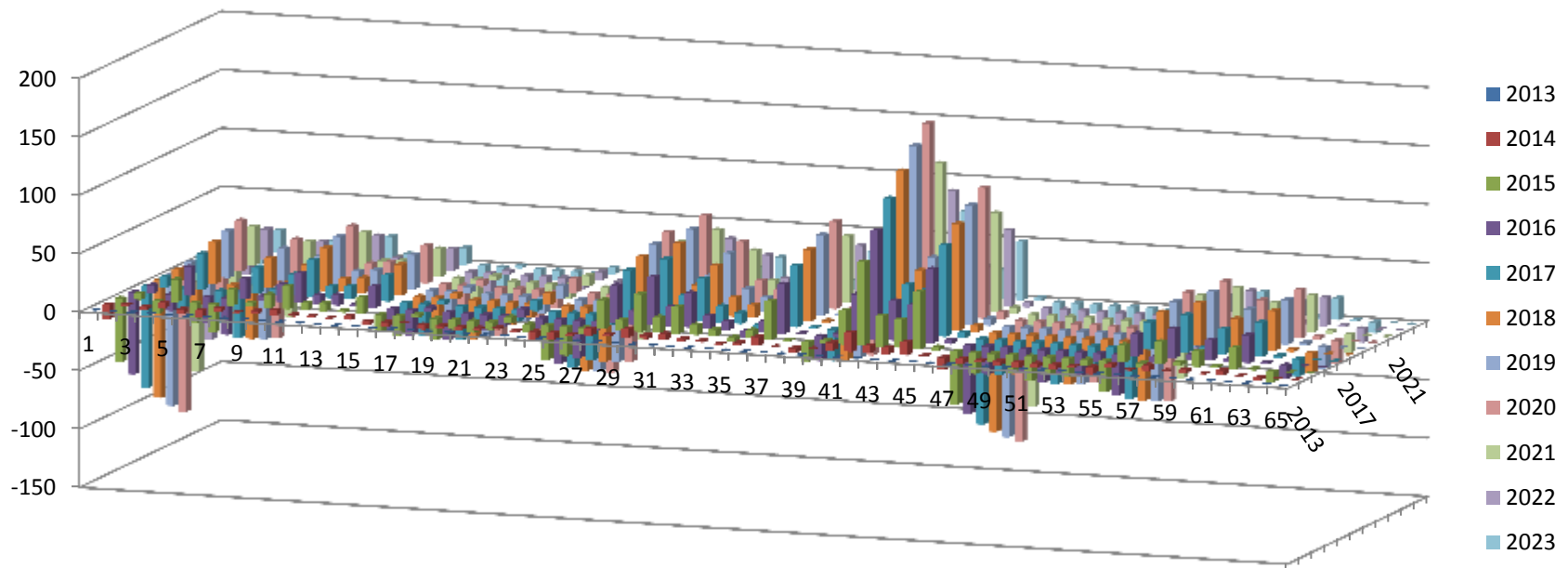
Thank you for your attention

MM
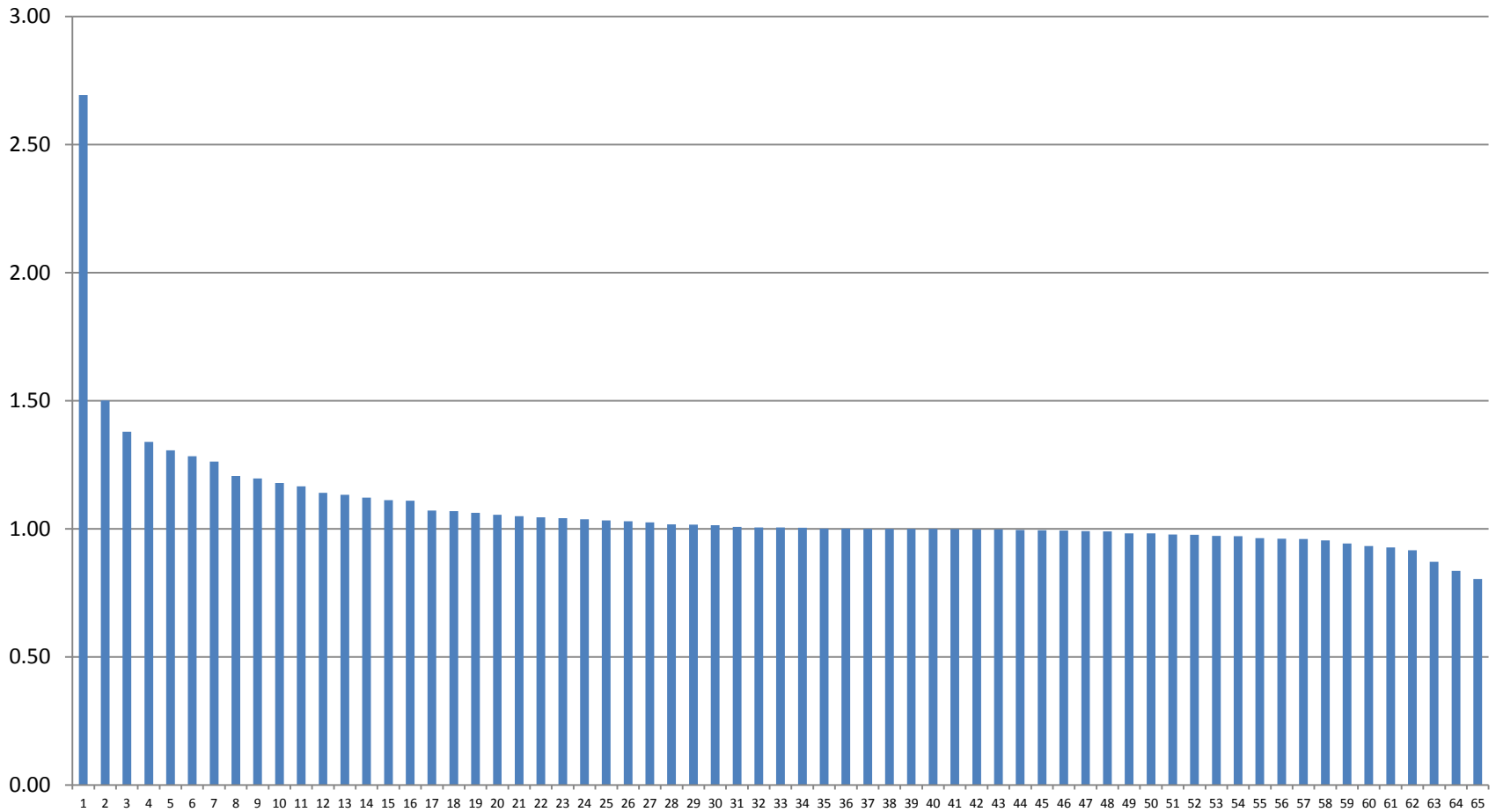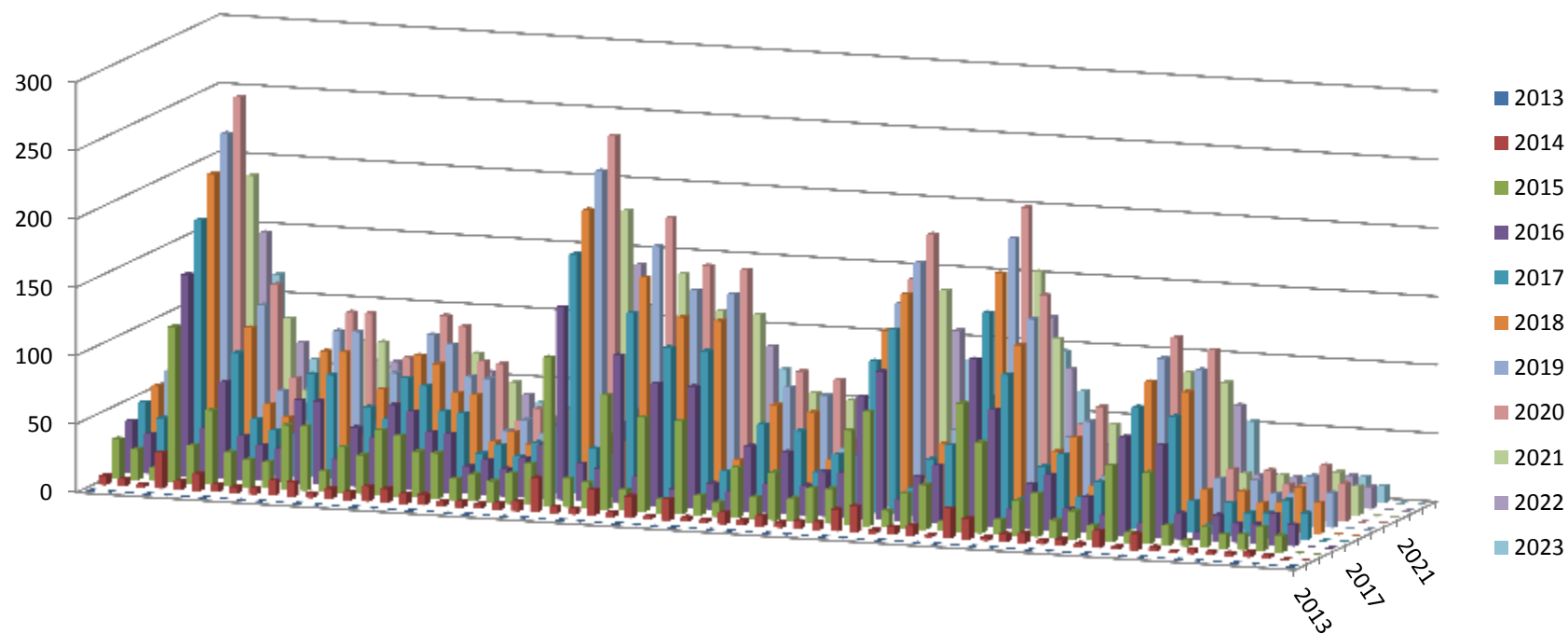
Indirect impact by structure (8) - variation from the benchmark, in millions of euro

Table 3: **On-going scheme for the Healthcare system investment, in millions of euro**.

Operational Programmes	ESI Funds	2014	2015	2016	2017	2018	2019	2020	TOTAL
Regional OP	ERDF	0.0	0.0	0.0	0.0	33.0	-	-	33.0
Human Capital OP	ESF - YEI	0.0	0.0	0.0	54.7	23.6	-	-	78.3
Competitiveness OP	ERDF	0.0	0.0	0.0	0.0	0.0	-	-	0.0
Regional OP	ERDF	0.0	0.0	0.0	0.0	31.7	-	-	31.7
Human Capital OP	ESF - YEI	0.0	0.0	0.0	10.1	4.4	-	-	14.4
Competitiveness OP	ERDF	0.0	0.0	0.0	0.0	0.0	-	-	0.0
TOTAL	-	0.0	0.0	0.0	64.7	92.7	-	-	157.4

GDP growth by evaluation ex-ante and on-going+projection