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The role of an industry in the economy

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How to measure the role of an industry: Two perspectives

Impact models (forward linkages)

Content approach – based on factor content of trade (backward linkages)

Backward linkages: Impact models

The question about impact is: what would have happened if all domestic production of particular branch were replaced by imports. The answer may be given by a counterfactual simulation. So, the result depend on the model.

The total impact is usually decomposed into three components: direct, indirect, and induced. First could be read directly from the statistics, the second could be calculated using Leontief model. The third includes various economic mechanisms.

Example of impact analysis: GDP generated by the Polish pharmaceutical industry
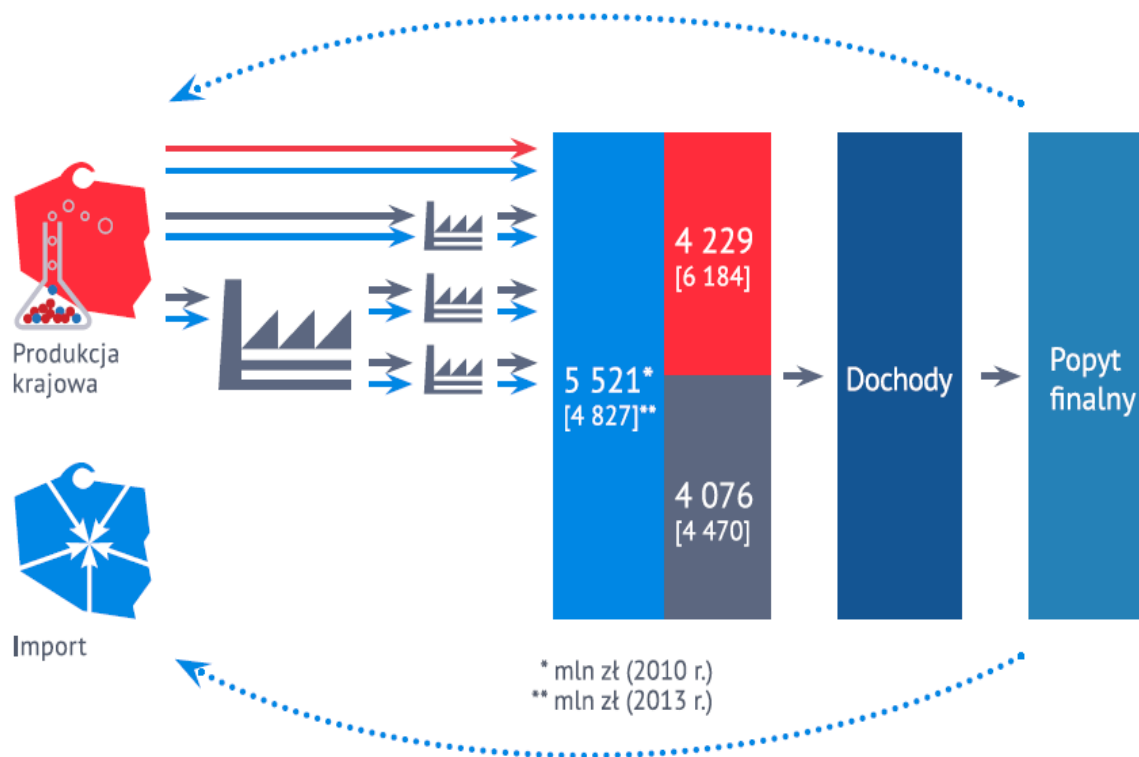
Source: DELab UW, PZPPF (2015), *Makroekonomiczne aspekty znaczenia sektora farmaceutycznego dla polskiej gospodarki, based on Polish i-o table*

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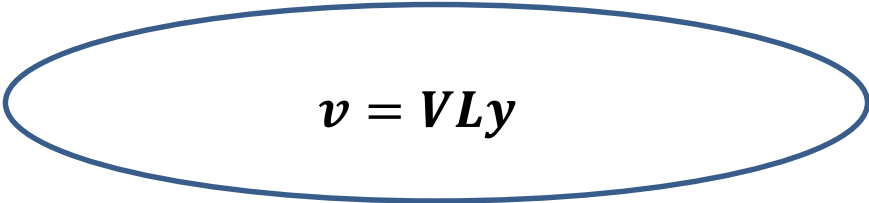University of Lodz

Direct and indirect impact: simple Leontief model
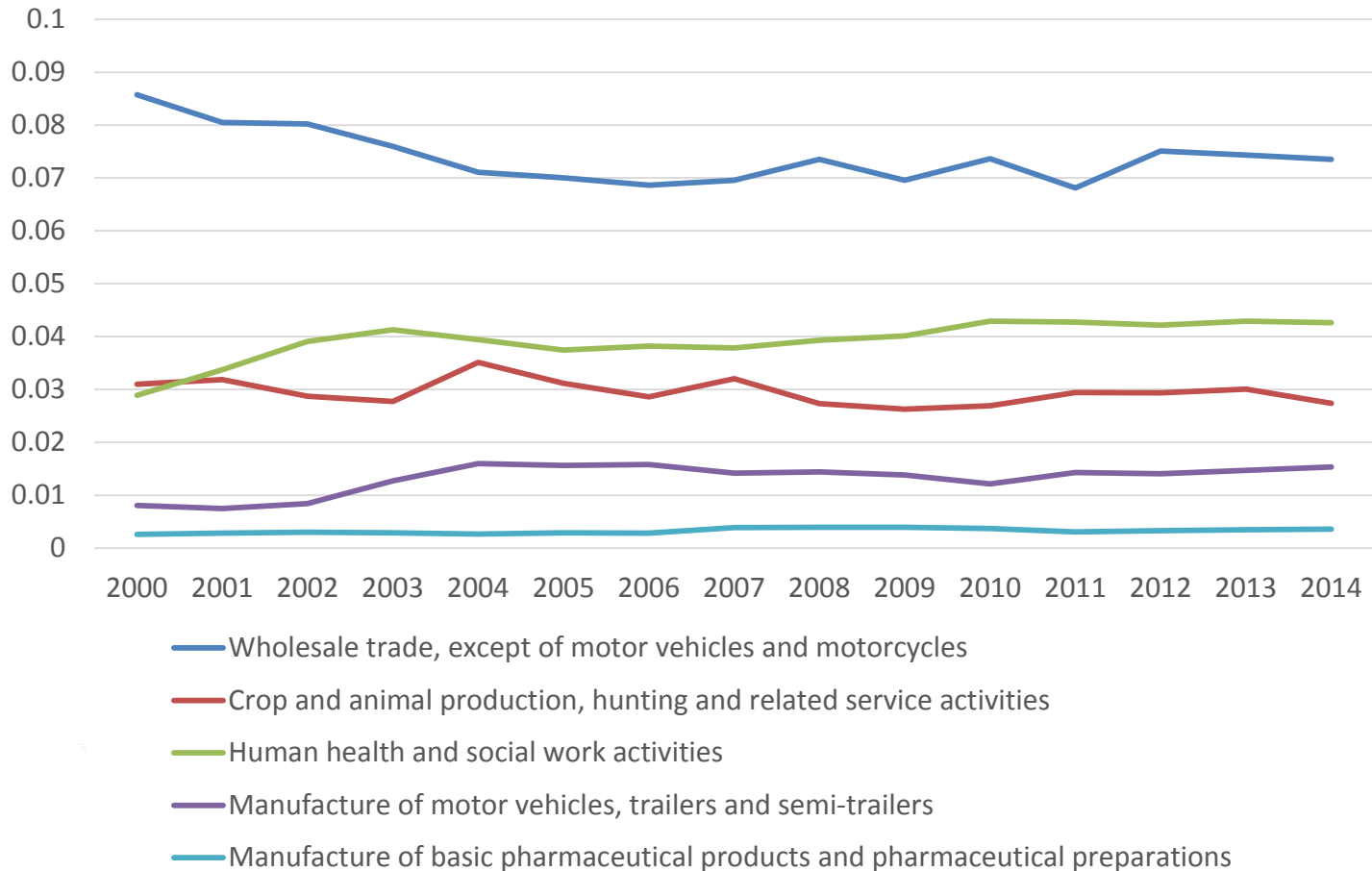
$$x = Ax + y$$

$$x = (I - A)^{-1}y = Ly$$

$$v = VLy$$

v – value added + taxes less subsidies on products
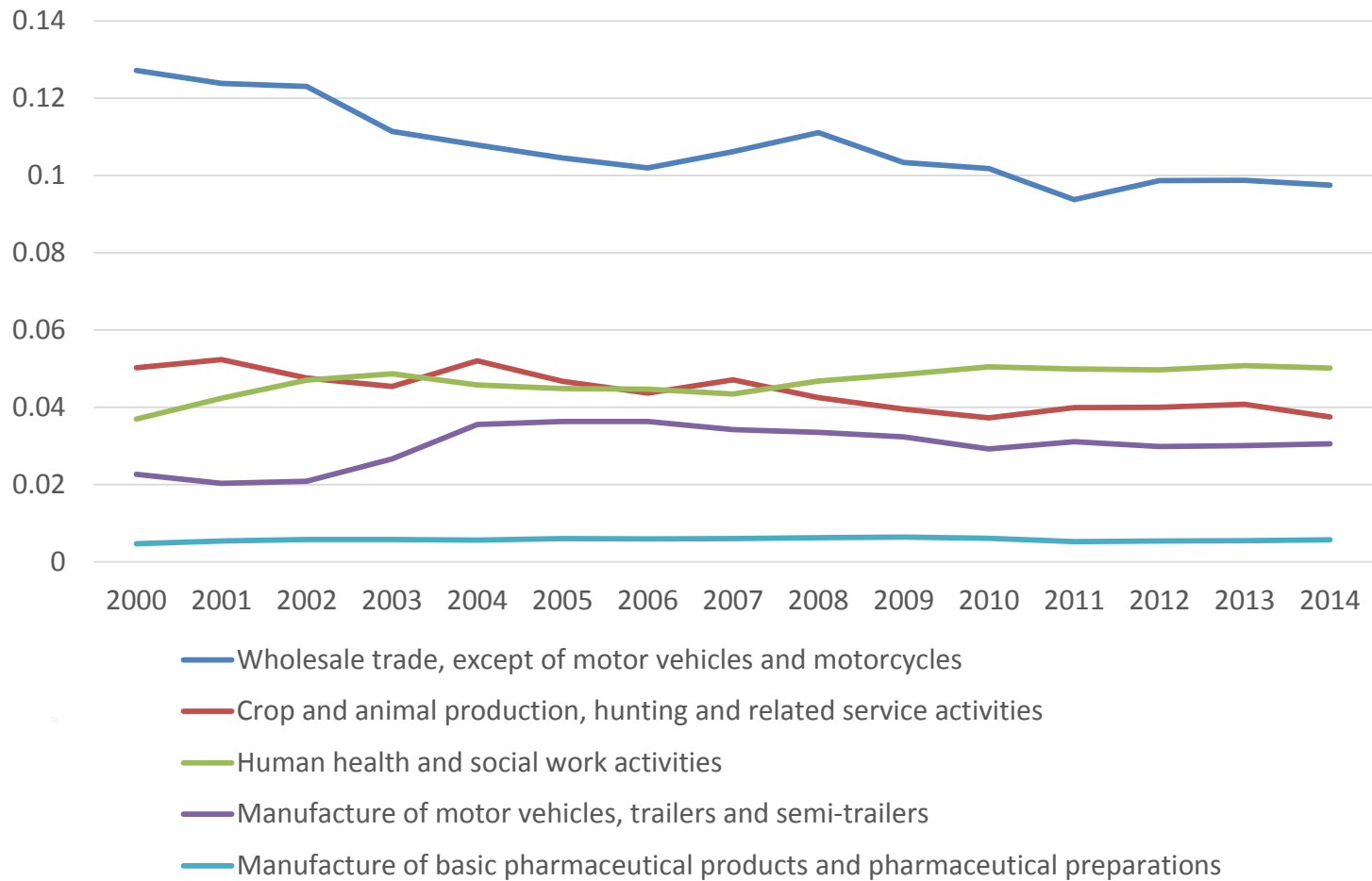V – the same per unit of output (diagonalised vector)

Direct effects on GDP

Wholesale trade, except of motor vehicles and motorcycles

Crop and animal production, hunting and related service activities

Human health and social work activities

Manufacture of motor vehicles, trailers and semi-trailers

Manufacture of basic pharmaceutical products and pharmaceutical preparations

Source: own calculations based on WIOD Release 2016

Direct and indirect effects on GDP

Source: own calculations based on WIOD Release 2016

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Direct and indirect impact of all branches on GDP

Source: own calculations based on WIOD Release 2016

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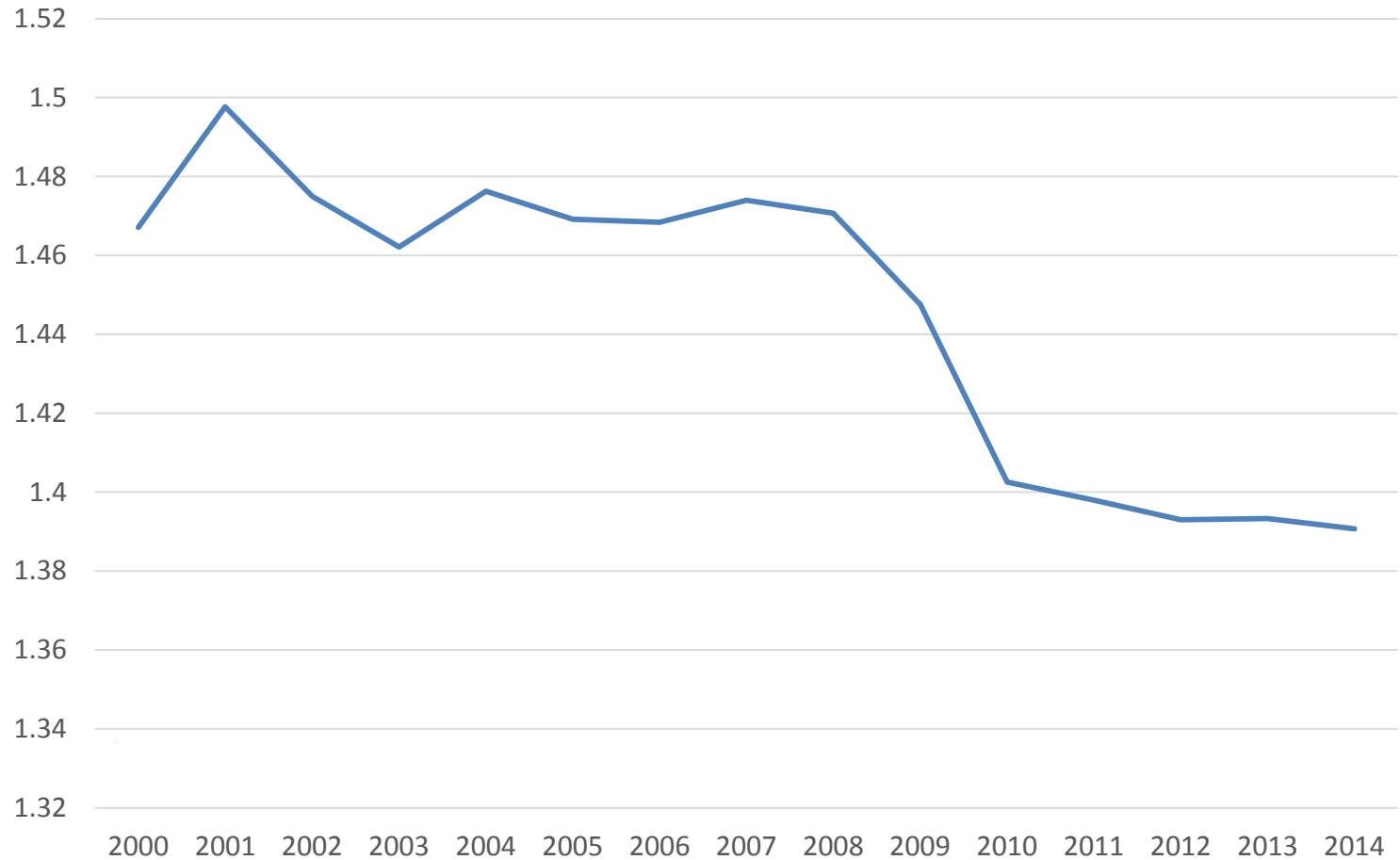
First attempt to use PortableDyme for Poland: Total impact of crop and animal production etc. on GDP. Historical GDP vs. simulation results

Source: own calculations based on WIOD Release 2016
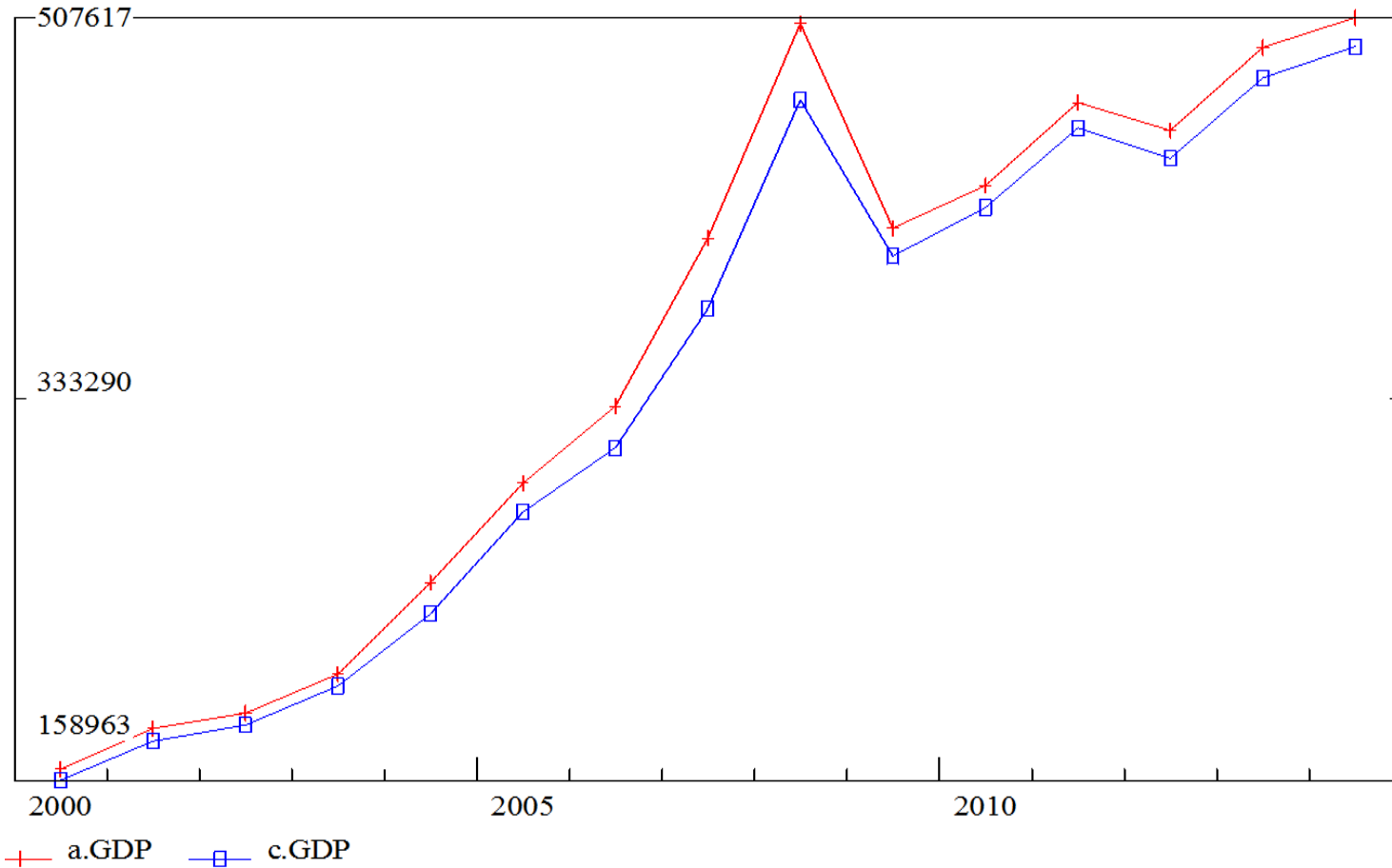
Forward linkages: Factor content approach

Should we estimate how much value added produced in firms belonging to a sector is embodied in trade?

Or should we estimate how much output of a sector were produced for the purpose of export?

Method – output content

$$x = Ax + y$$

$$x = (I - A)^{-1}y = Ly$$

$$x = x_D + x_E = Ly_D + Ly_E$$

$$v = v_D + v_E = VLy_D + VLy_E$$

I-th element of vector x_E tells how much output of sector i is needed for producing exports.

Example: Study of KIBS content of trade

Michał Przybyliński, Joanna Wyszkowska-Kuna, *The Content of Knowledge Intensive Business Services In International Trade – Evidence from the European Union Countries, paper presented at* **International Trade and Finance Association's 27th Annual Conference on** *Leading Issues in International Trade and Finance,* **Poznań 2017**

In the this study Knowledge Intensive Business Services (KIBS) are defined according to the narrowest approach, as comprising services delivered by divisions:

62-63 Computer programming, consultancy and related activities; information service activities

69-70 Legal and accounting activities; activities of head offices; management consultancy activities

71 Architectural and engineering activities; technical testing and analysis

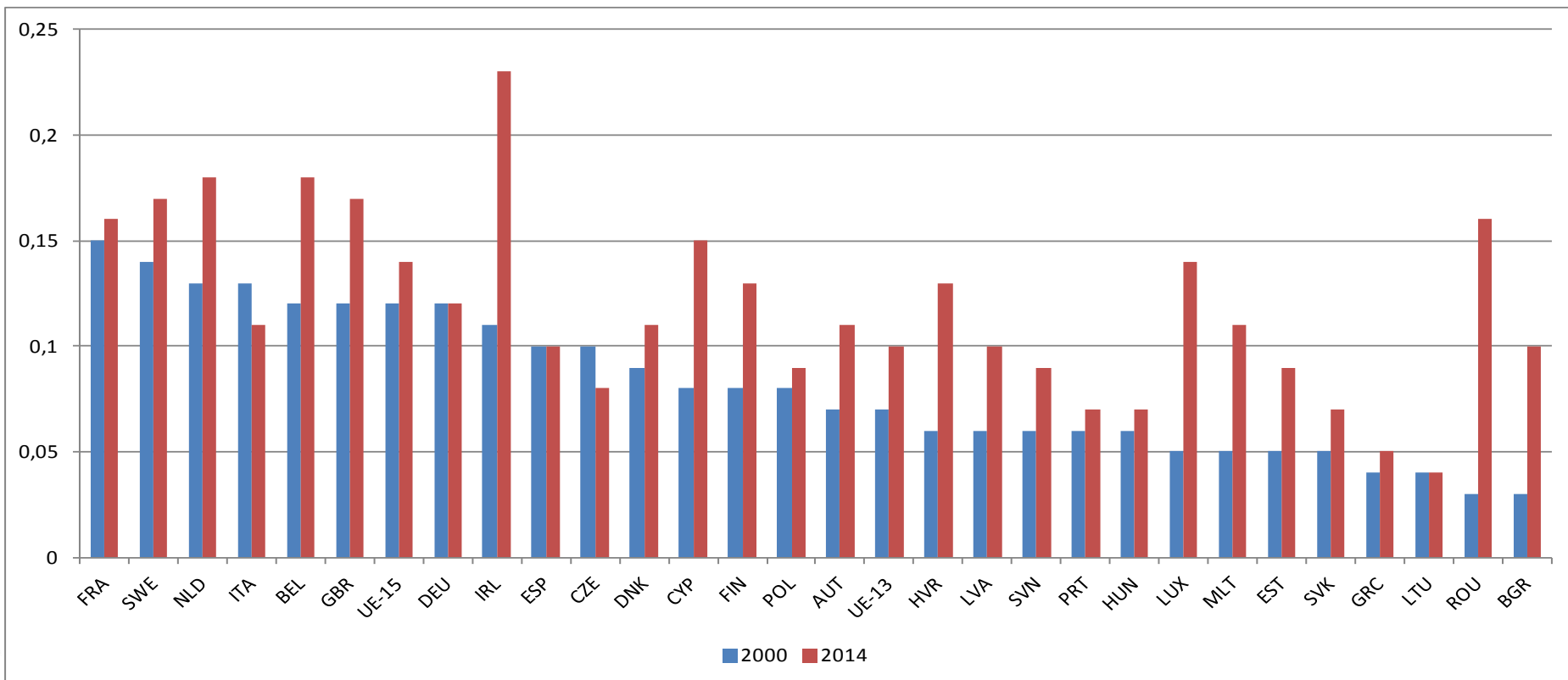72 Scientific research and development

73 Advertising and market research

Value of KIBS sector output imputed to 1 USD of export – the KIBS intensity of export

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Share of KIBS sector in all output imputed to export – the importance of KIBS for export

Legend: ■ 2000 ■ 2014

Categories (left to right): FRA, SWE, NLD, BEL, IRL, GBR, UE-15, DEU, ITA, ESP, DNK, CZE, AUT, POL, FIN, CYP, HVR, UE-13, LUX, MLT, HUN, SVN, PRT, EST, LVA, GRC, SVK, LTU, ROU, BGR

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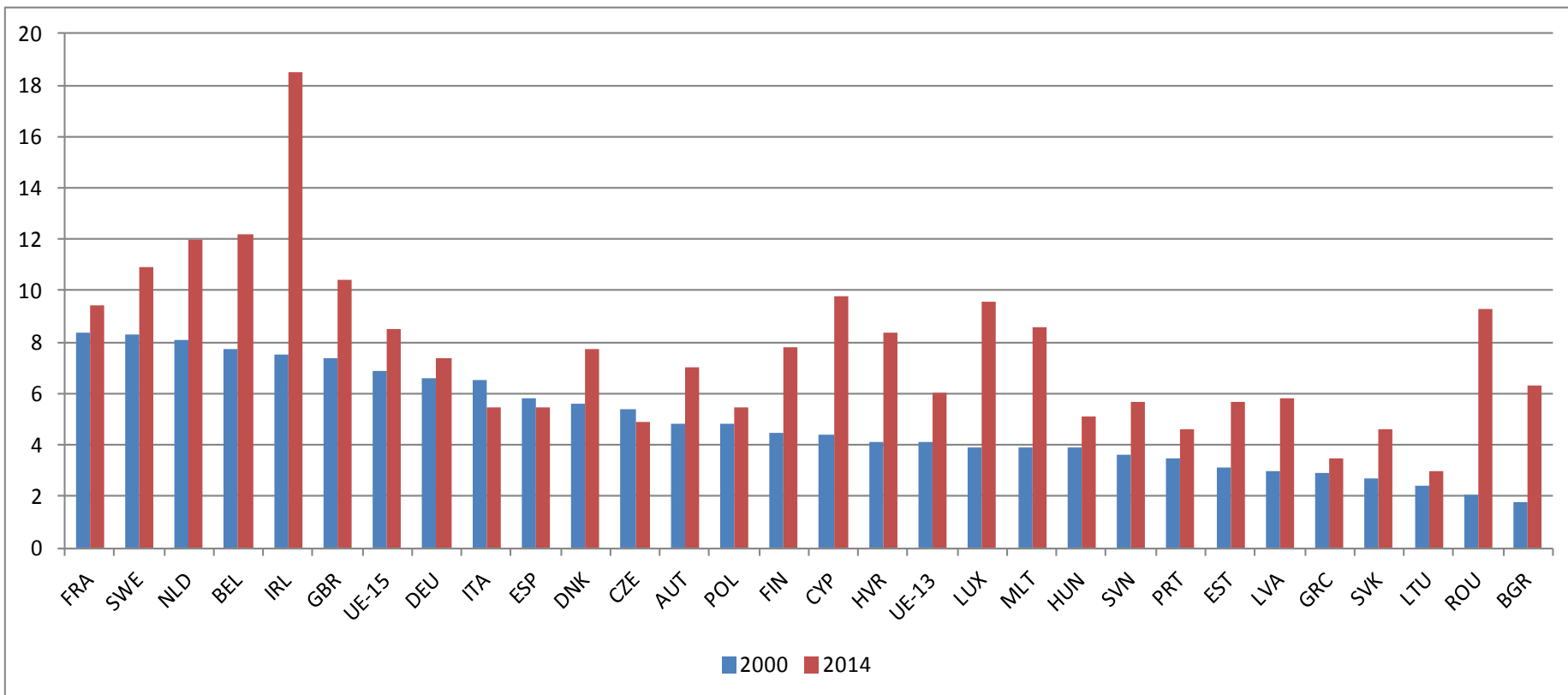
Value of KIBS sector output imputed to 1 USD of export over the value of KIBS sector imputed to 1 USD of domestic final demand – relative KIBS intensity of export
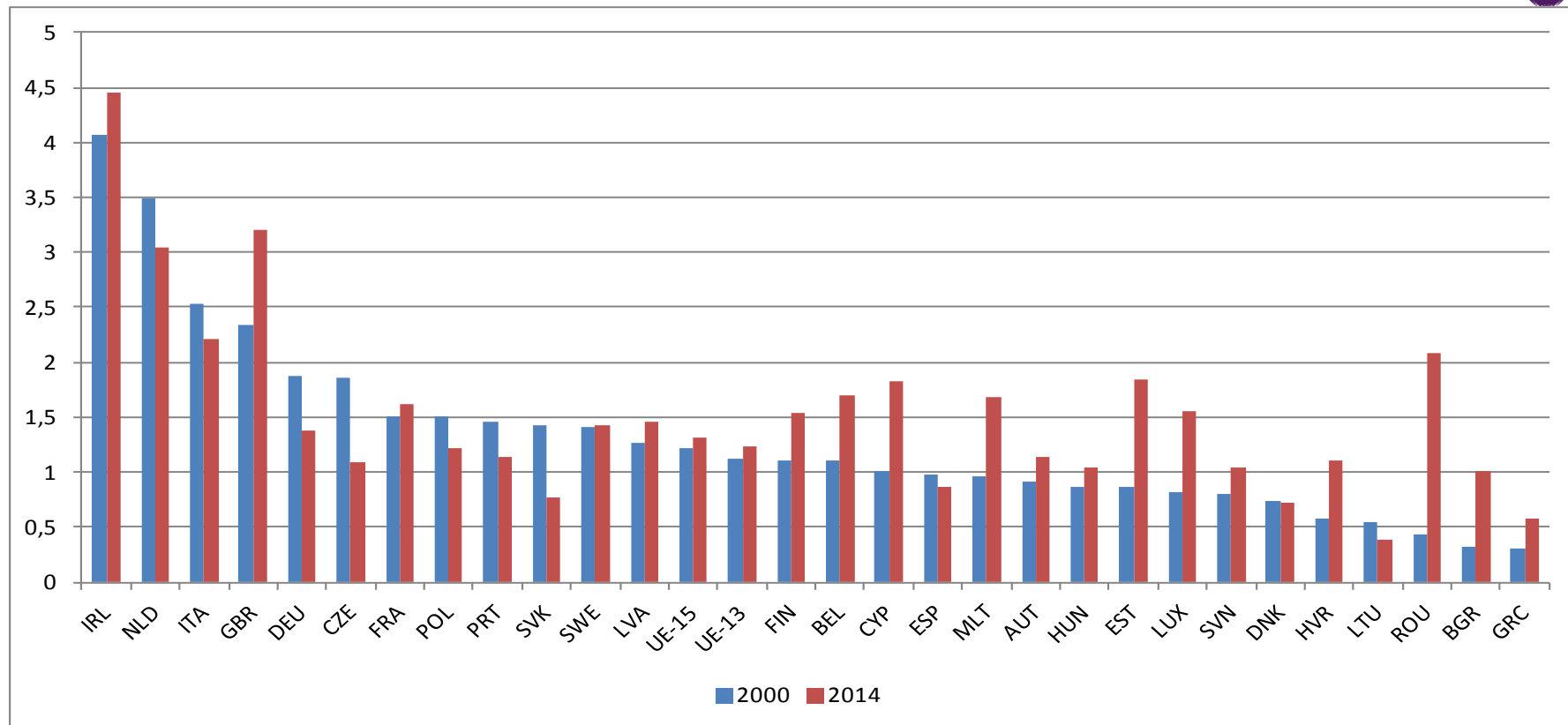
Source: Przybyliński M., Wyszkowska-Kuna J., *The Content of Knowledge Intensive Business Services In International Trade – Evidence from the European Union Countries, paper presented at* International Trade and Finance Association's 27th Annual Conference on *Leading Issues in International Trade and Finance,* Poznań 2017, calculations based on WIOD Release 2016
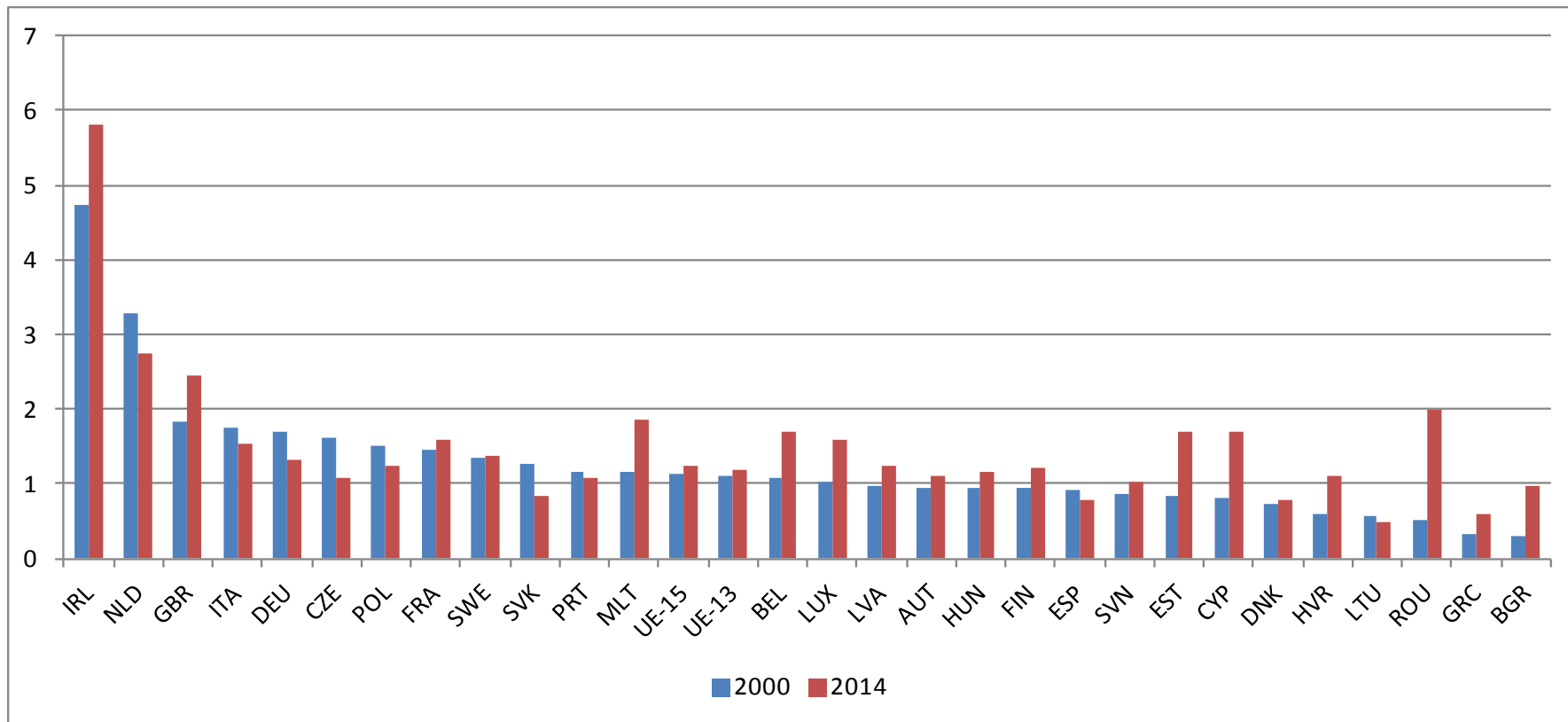
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Share of KIBS sector in all output imputed to export over the share of KIBS sector in all output imputed to domestic final demand – relative importance of KIBS

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Final remarks

Assessing the role of particular idustries in the economy is a popular task for economic analysts.

Simple analytical formulas have their limitations. The assessment of the role of an industry in the economy needs a simulation performed on appropriate model. This remark especially applies to so called induced effects.

At this moment, this is the first reason for developing the Polish multisectoral model.