Policy evaluation, technology upgrading and catching up in Latin America: the case of Argentina

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The S&T system in Argentina at a glance: the main institutions

Secretary of Science, Technology and Innovation (former Ministry)

- National Council of Scientific and Technical Activities (CONICET)
- National Agency for Space Activities (CONAE)
- National Agency for the Promotion of Science and Technology (ANPCYT)

National Institute of Agricultural Technology (INTA)

National Institute of Industrial Technology (INTI)

National Agency for Atomic Energy (CNEA)

Other specialized agencies (mining, defense, etc.)

Public and private universities

Technology policies in Argentina: the main instruments

1996: creation of ANPCYT

Four funds:

- FONCYT: mostly aimed at financing basic and applied research with no direct commercial application
- FONTAR: subsidies (matching grants), tax credits and soft credits for innovation projects (many of them for SMEs)
- FONSOFT: subsidies and credits for the software industry
- FONARSEC: sectoral funds (high tech sectors-general purpose technologies), research consortiums

FONTAR's evaluations

Mostly requested by funders (IADB)

Methodology: panel data, differences in differences/matching techniques, fixed effects

Arza, V., & Vazquez, C. (2014). Evaluación del diferencial en el aumento de inversión en actividades innovativas respecto a ventas entre empresas beneficiarias del Programa de Innovación Tecnológica vs grupo control. Argentina 2008-2012. Consultora BSI - Aguilar. Buenos Aires.

___ (2015). Evaluación del diferencial en el aumento de inversión en actividades innovativas respecto a ventas entre empresas beneficiarias del Programa de Innovación Tecnológica vs grupo control. Argentina 2008-2013. Consultora BSI - Aguilar. Buenos Aires.

Binelli, C., & Maffioli, A. (2007). *A Micro econometric Analysis of Public Support to Private R&D in Argentina. Review of Applied Economics, 21*(3), 339-359.

Castillo, V., Maffioli, A., Rojo, S., & Stucchi, R. (2014). *Knowledge Spillovers of Innovation Policy through Labor Mobility: An Impact Evaluation of the FONTAR Program in Argentina.* IDB Working Paper Series 488. Inter-American Development Bank (IDB). Washington, DC.

Chudnovsky, D., López, A., Rossi, M., & Ubfal, D. (2006). *Evaluating a Program of Public Funding of Private Innovation Activities. An Econometric Study of FONTAR in Argentina.* Working Paper: OVE/WP-16/06. Office of Evaluation and Oversight, OVE, Inter-American Development Bank. Washington, D.C.

López, A., Reynoso, A. M., & Rossi, M. (2010). Impact Evaluation of a Program of Public Funding of Private Innovation Activities. An Econometric Study of FONTAR in Argentina. Working Paper: OVE/WP-03/10. Office of Evaluation and Oversight, Inter-American Development Bank. Washington, D.C.

Sanguinetti, P. (2005). *Innovation and R&D Expenditures in Argentina: Evidence from a firm level survey.* Documento de trabajo. Universidad Torcuato Di Tella. Buenos Aires.

Sanguinetti (2005)

- Source of information: Innovation Surveys, 1992-2001
- 639 firms
- No information on amounts-type of instrument-year of treatment
- Results:
  - Positive effects on R&D expenditures but not on innovation expenditures

Binelli and Maffioli (2007)

- Source of information: Innovation Surveys, 1992-2001
- 424 firms, 23 treated
- Results:
  - Positive effects on R&D expenditures

Chudnovsky et al (2006)

- Source of information: Innovation Survey, 1998-2004
- 414 firms: 136 firms with matching grants, 62 firms that had applied but without obtaining it and 216 that had not applied
- Results:
  - Positive impact on the ratio innovation expenditures/sales (mainly in firms with no innovation activities before the subsidy)
  - No crowding in effects

López et al (2010)

- Source of information: Innovation Survey, Monthly Industrial Survey, 1998-2005
- 1719 firms (93 with access to at least one FONTAR program)
- Results:
  - No robust estimations for innovation expenditures

Arza and Vazquez (2014)

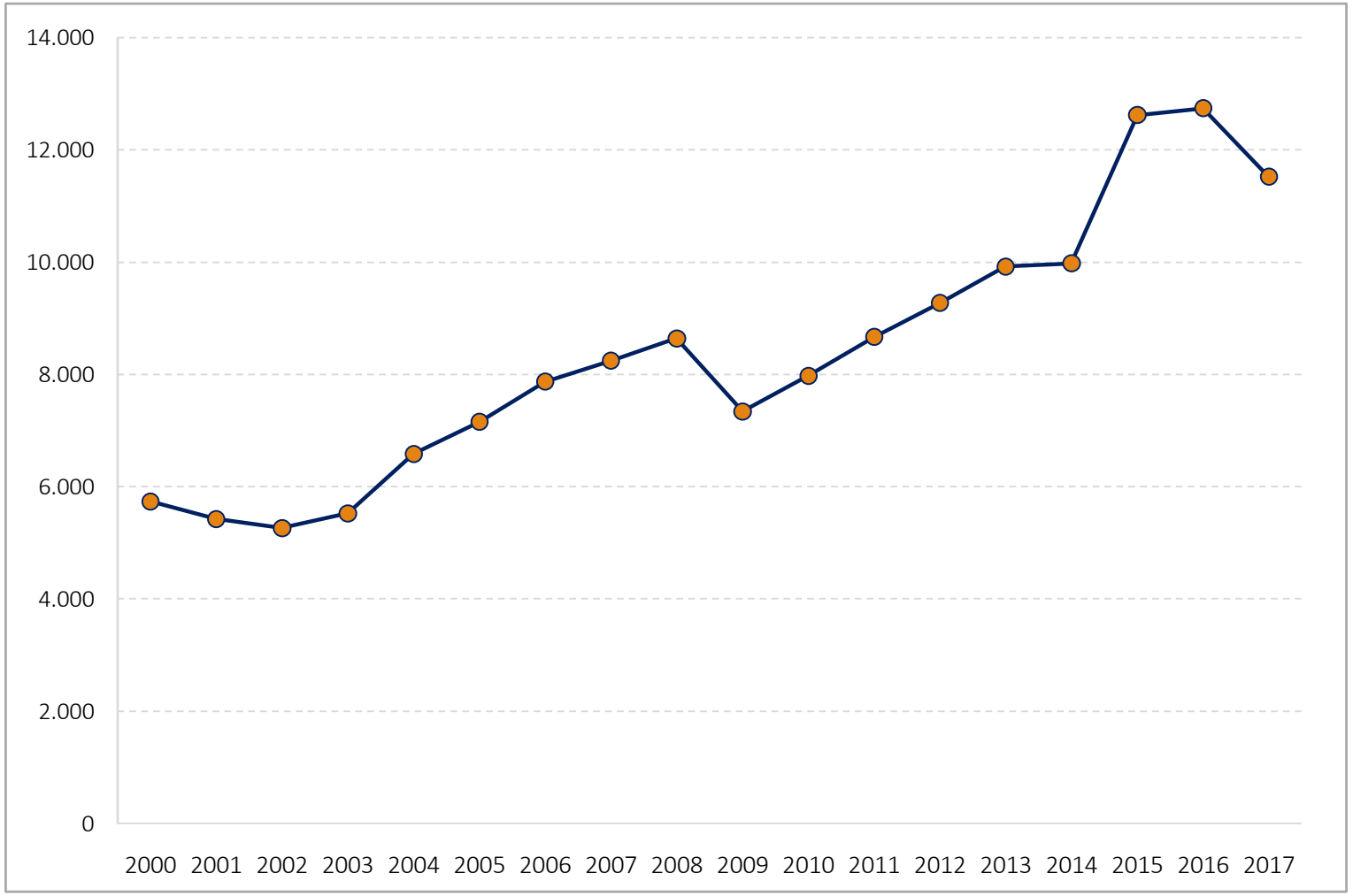
- Source of information: FONTAR administrative records, 2008-2012

- 498 firms (120 treated)
- Results:
  - Positive impact on innovation expenditures levels but not on intensity
  - No crowding in effects

Arza and Vazquez (2015)

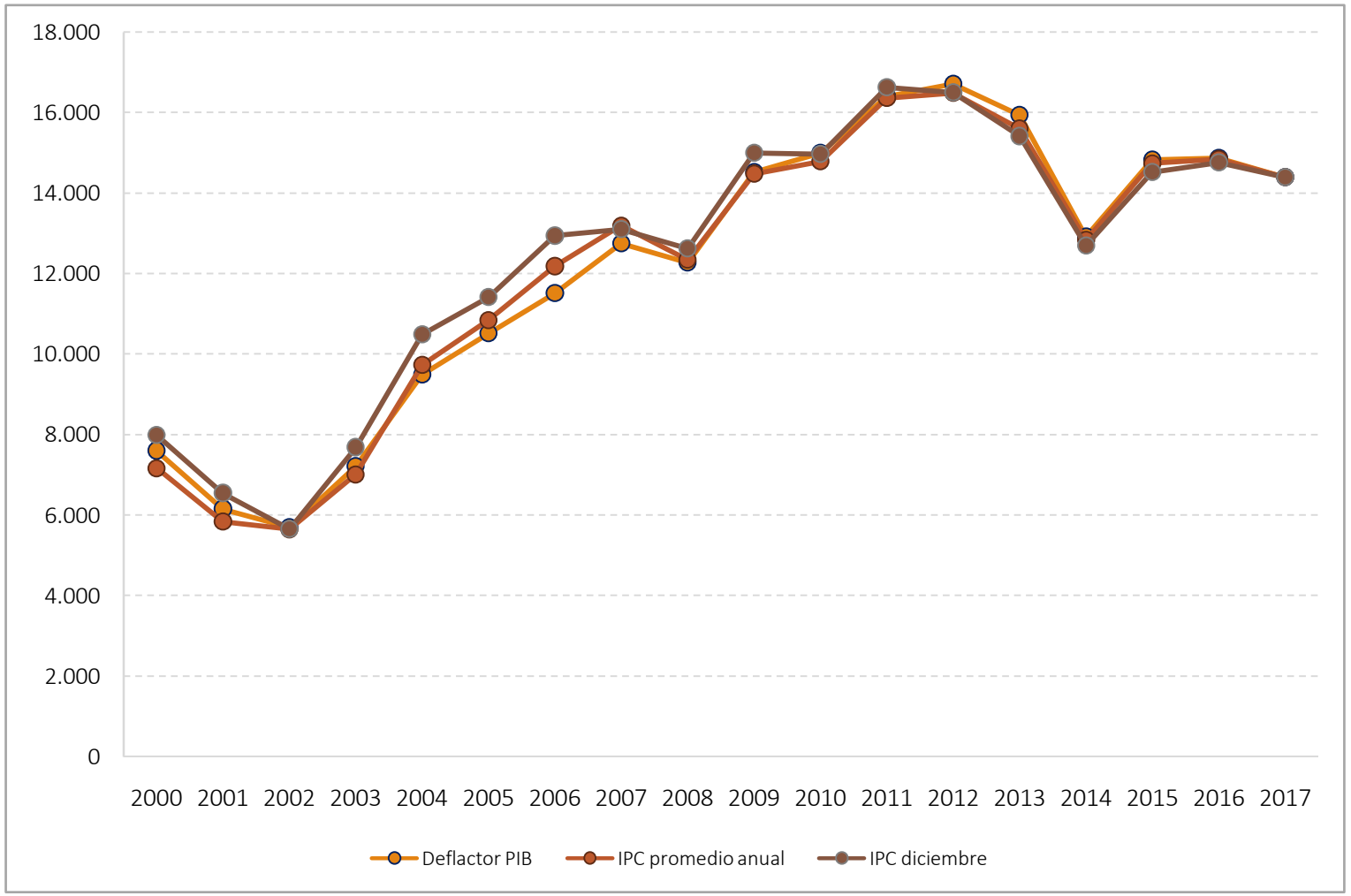
- Source of information: FONTAR administrative records, Innovation Survey, 2008-2013
- 2684 firms (165 treated)
- Results:
  - Positive impact on innovation expenditures levels but not on intensity

Argentina, R&D personnel in firms (public+private), FTE



Source: own elaboration on the basis of UNESCO Institute for Statistics data and MINCYT.

Argentina, R&D expenditures, firms (public + private), $ million, constant prices (2017)



Source: own elaboration on the basis of UNESCO Institute for Statistics data and MINCYT.

But in 2019 only 8 of 31 ANPCYT instruments are functioning!

"Neoliberalism"?

Budget restrictions? (fiscal crisis, IMF agreement)

Reluctance to grant subsidies to private firms

"Entrepreneurial model"?(Silicon Valley + Schumpeter Mark I)

And/or ….

Where has all the innovation gone?

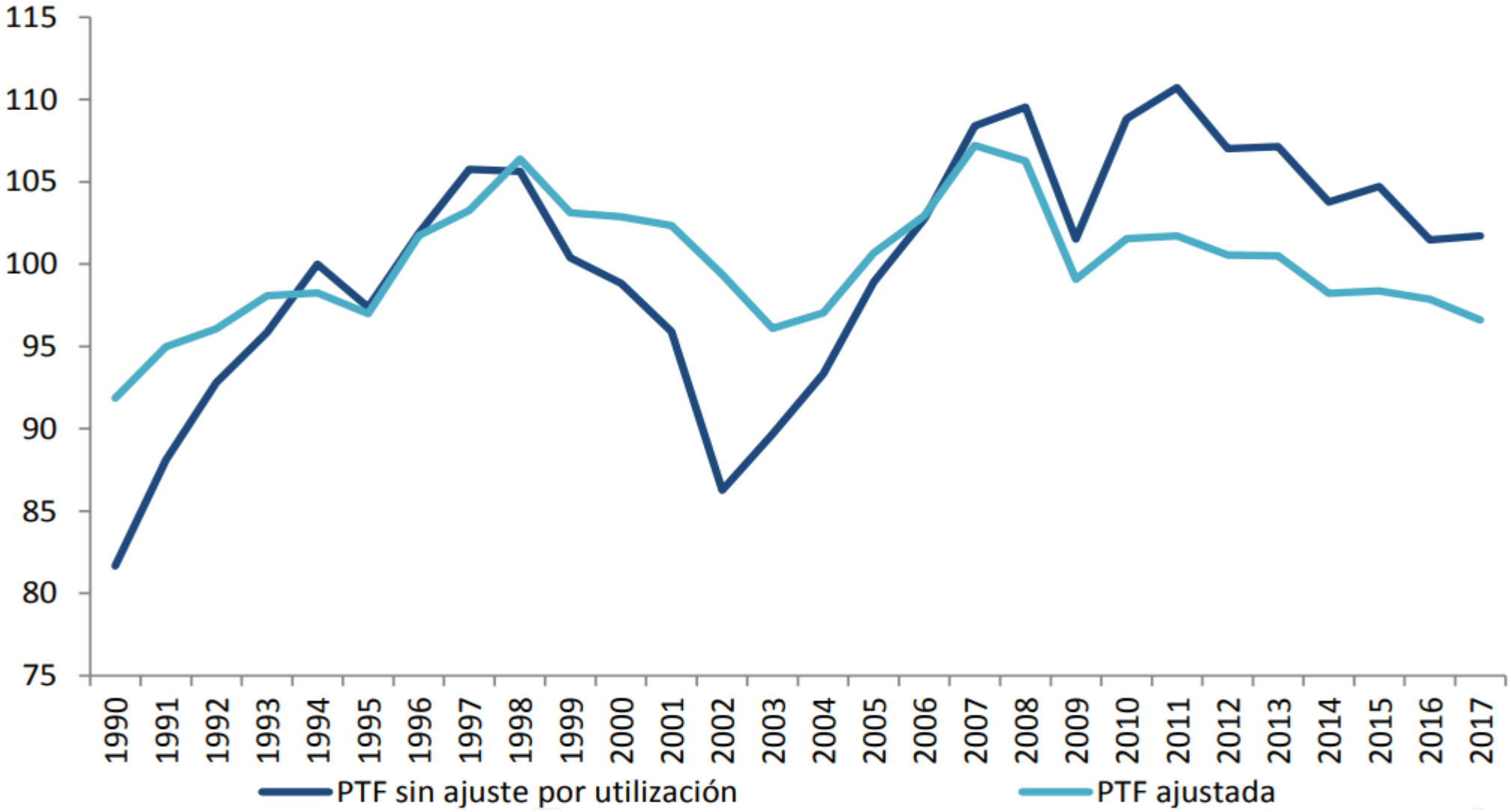
Only one evaluation finds a positive impact on innovation outcomes (López et al, 2010)

No effects on firms performance, except for Castillo et al (2014) –the same goes for FONSOFT evaluations (Castro and Jorrat 2013, Barletta et al, 2014)

- Source of information: FONTAR and employer-employee administrative records 1996-2006
- All firms with formal employees
- Results:
  - Employment growth
  - Increased probability of exporting and survival
  - Increased real wages
  - Spillovers to firms that hire employees of firms benefited by FONTAR
  - Direct effects 3-6 years after receiving the subsidy
  - Indirect effects: 1-3 years after hiring the employees

Barletta Florencia, Pereira Mariano y Yoguel Gabriel Mariano (2014). "Impacto de la política de apoyo a la industria de software y servicios informáticos". Buenos Aires, Centro Interdisciplinario de estudios en ciencia, tecnología e innovación.
Castro, Lucio y Jorrat, Diego (2013). "Evaluación de impacto de programas públicos de financiamiento sobre la innovación y la productividad: el caso de los Servicios de Software e Informáticos de la Argentina". Documento de trabajo N°115, CIPPEC, Buenos Aires.

Argentina, total factor productivity, 2004= 100

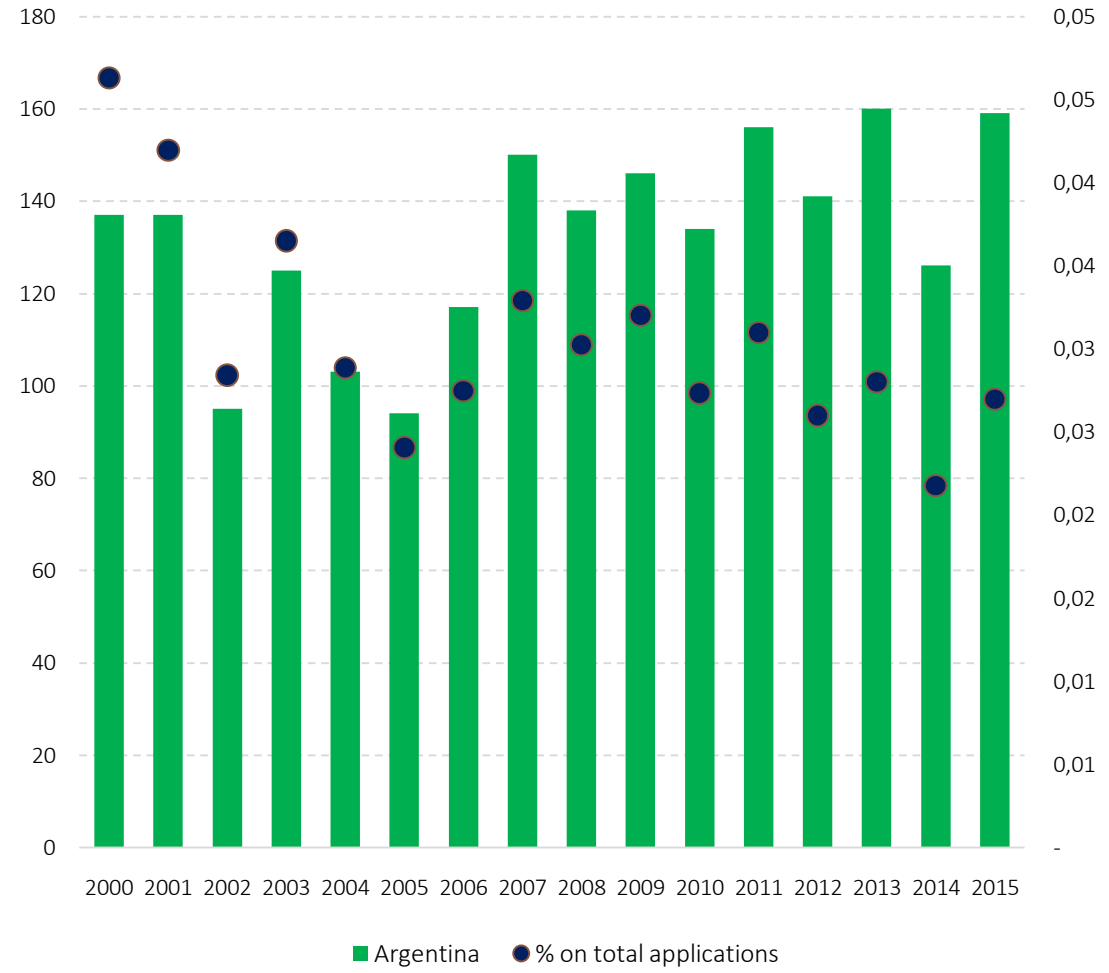


Source: Baumann Fonay and Cohan (2018)

Patenting in USA

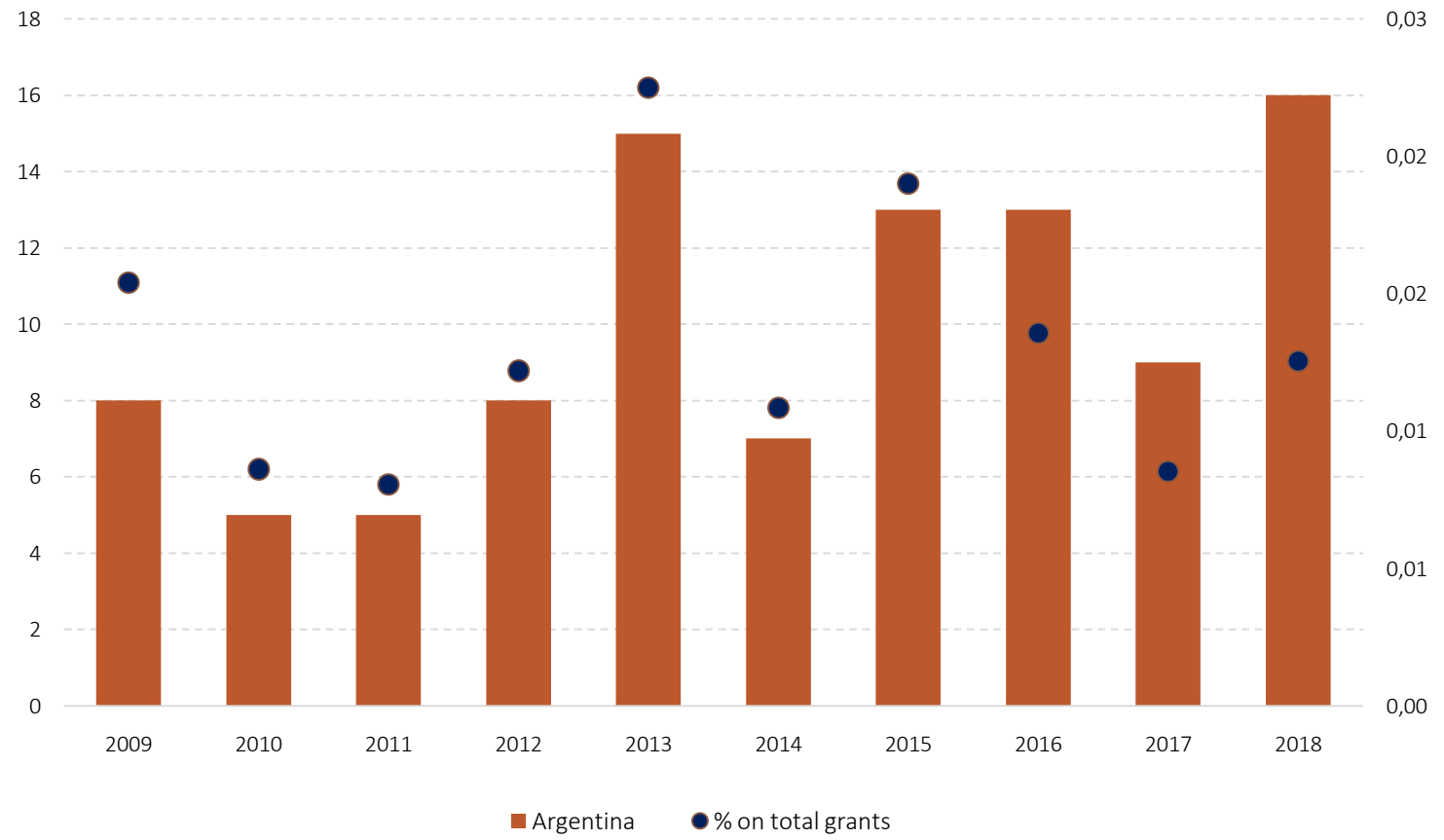
Grants

Applications



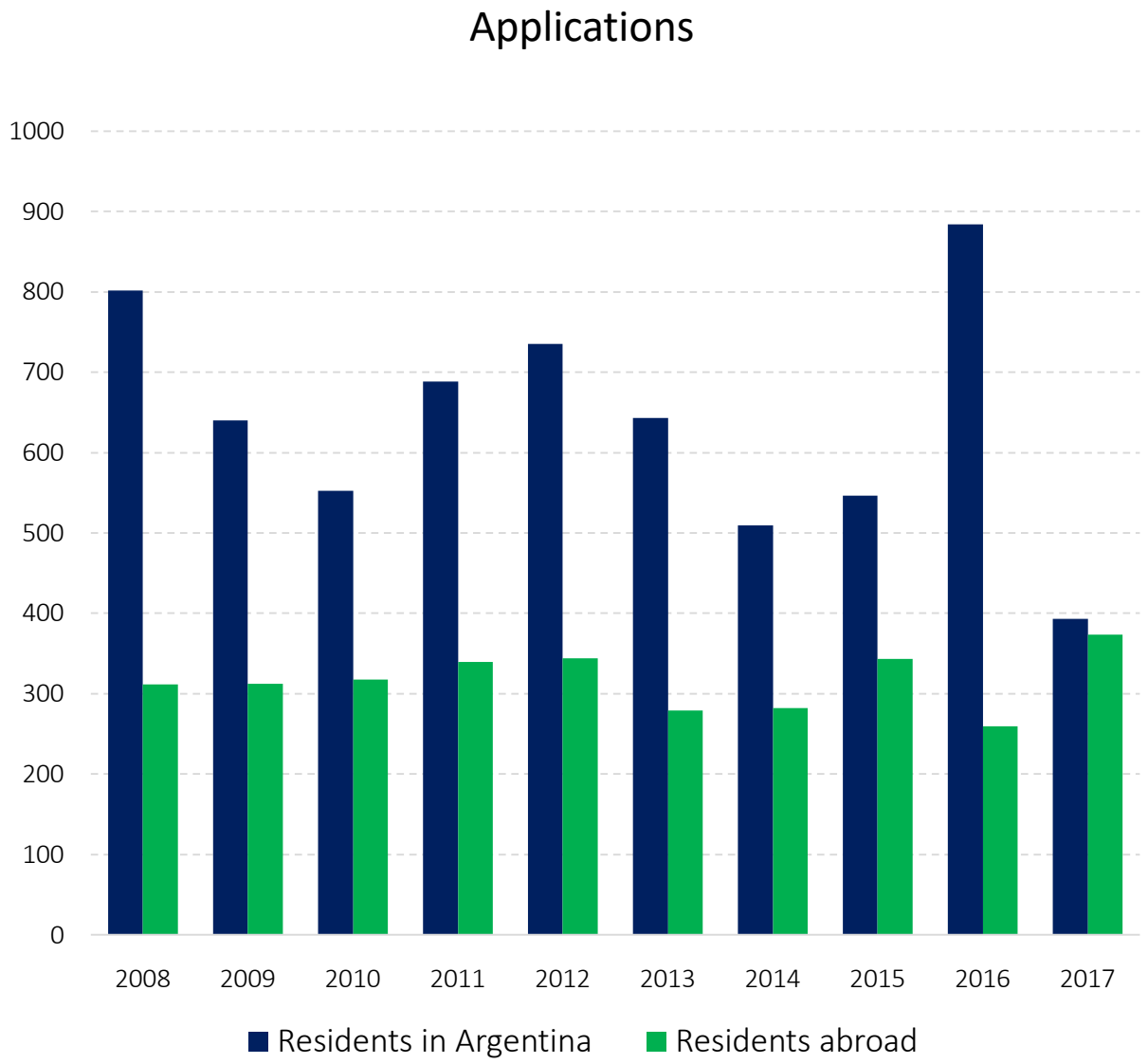
Source: own elaboration on the basis of U.S. Patent and Trademark Office data.

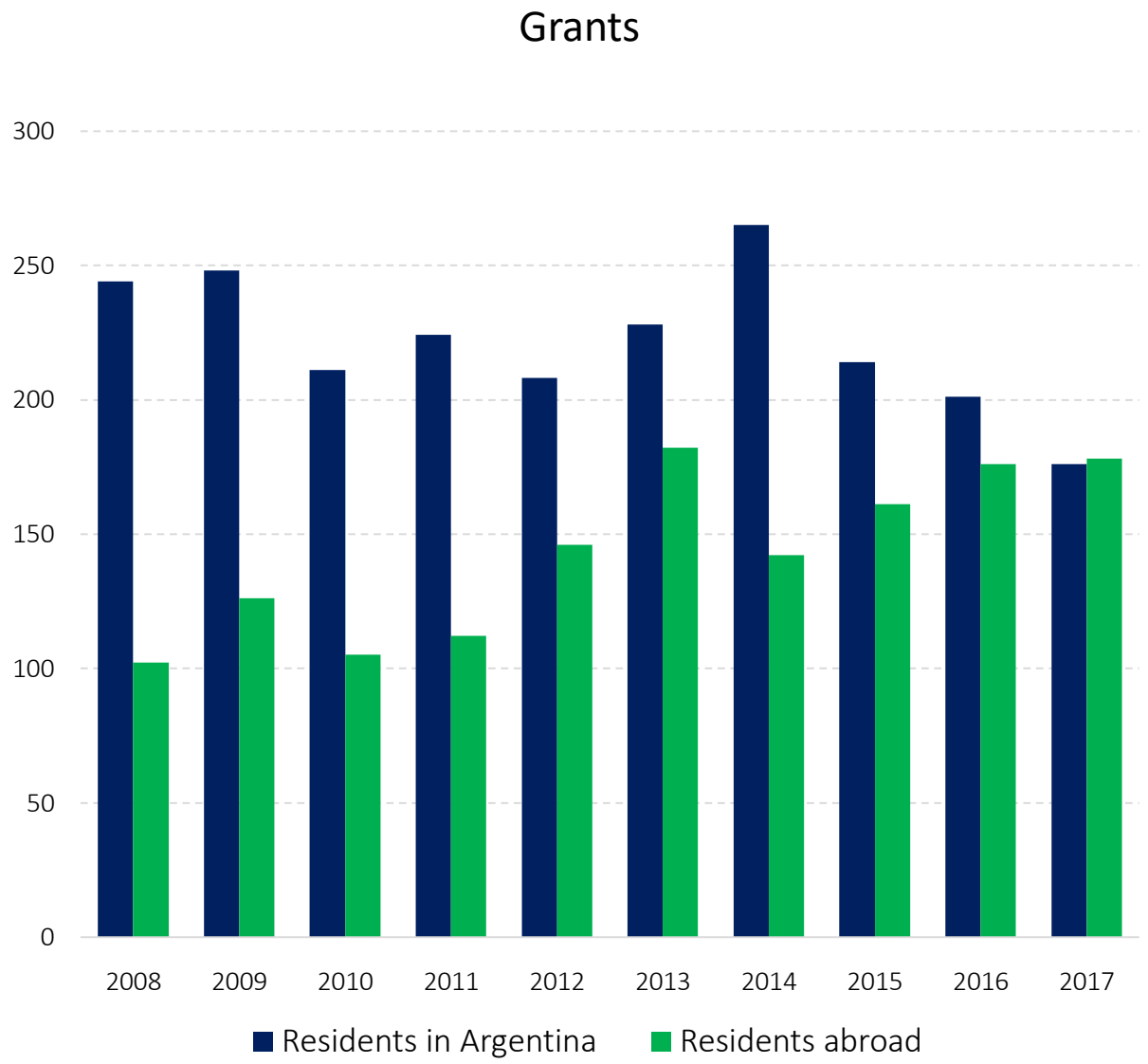
Patents granted at the European Patent Office



Source: own elaboration on the basis of European Patent Office data.

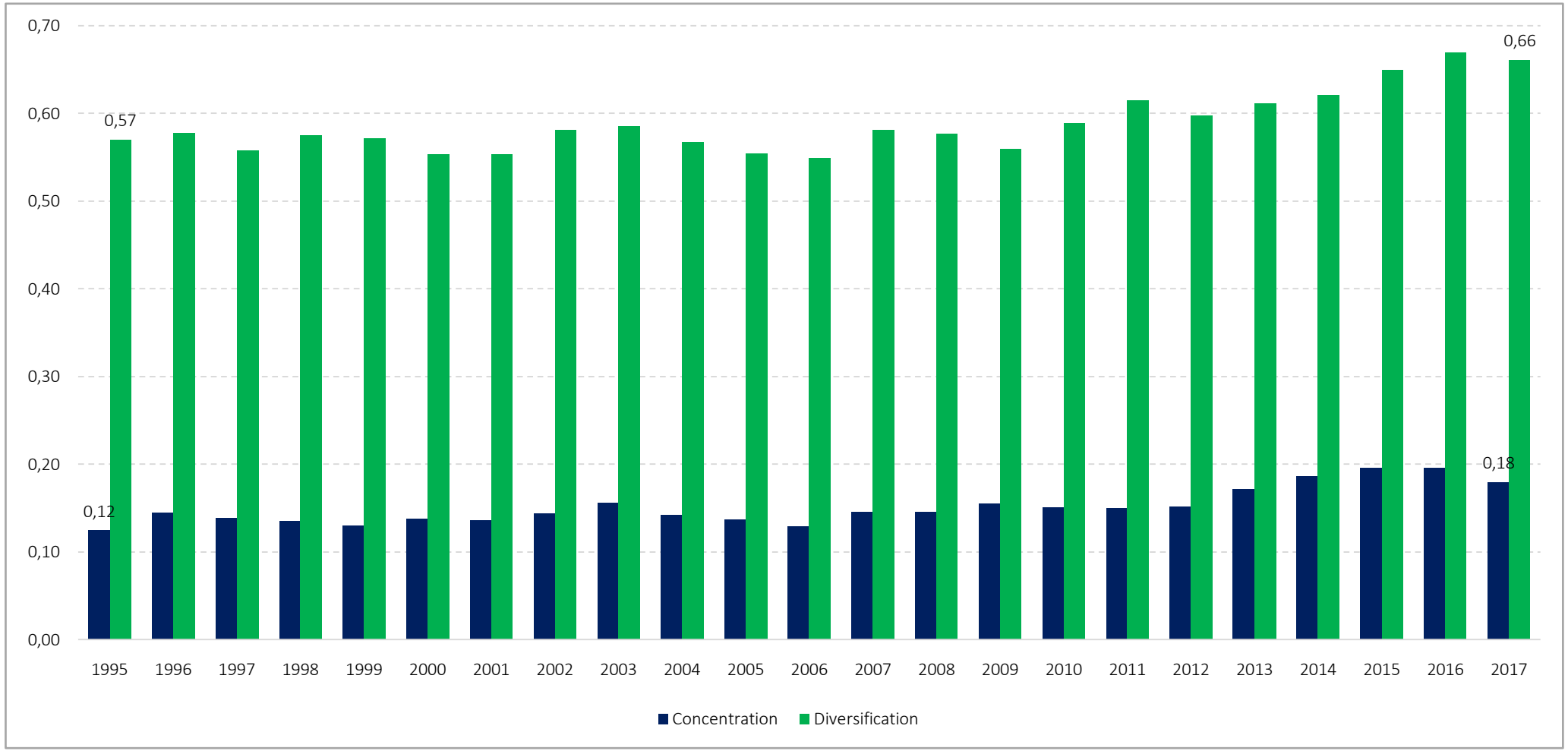
Residents patenting in Argentina and abroad





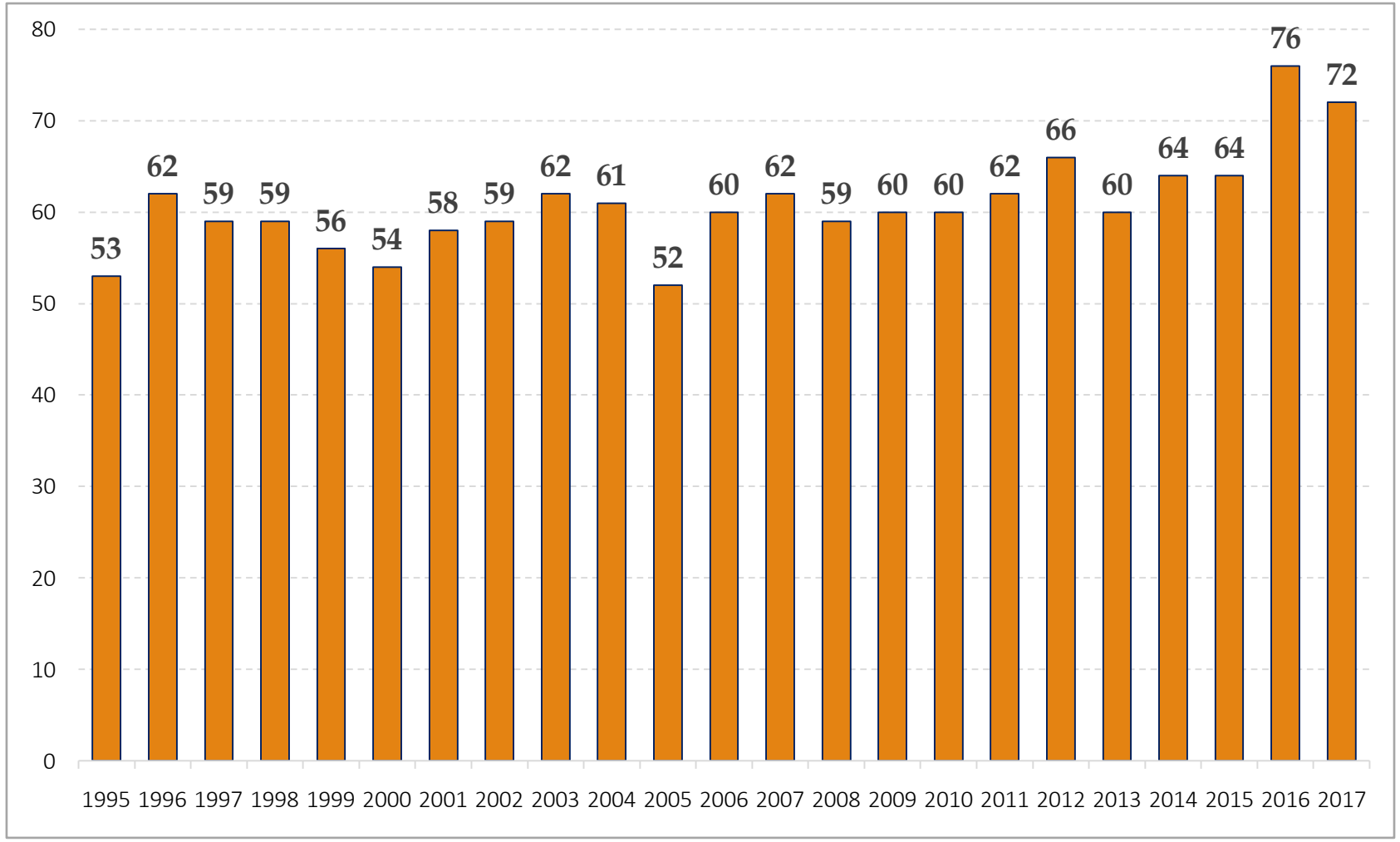
Source: own elaboration on the basis of the World Intellectual Property Organization. data

Export concentration and diversification indexes



Source: UNCTAD.

Argentina's position at the economic complexity ranking



Source: own elaboration on the basis of data from the Center For International Development (Harvard University) .

Possible explanations?

More time is needed …

Macroeconomic instability/stagnation

Policy framework (e.g.)

- Trade policy
- Competition policy
- Labor regulations

Lack of complementary assets (e.g. human capital, infrasstructure)

Small amounts of money for each project? (average: FONTAR: USD 100,000; FONARSEC: USD 1 million; FONSOFT: USD 30,000)

Limited range (around 2% of the potential universe of firms)

Lack of integration with productive development policies

Lack of an innovation lifecycle approach

THANK YOU!