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# Expansion of GM crops, antagonisms between MERCOSUR and the EU. The role of R&D and intellectual property rights' policy

Liliana Terradas-Cobas [a,b,*], Carlos Céspedes-Payret [a], Estanislao Luis Calabuig [b]

[a] Unidad de Ciencias de Epigénesis, Instituto de Ecología y Ciencias Ambientales, Facultad de Ciencias, Universidad de la República, Iguá 4225, piso11, Montevideo, Uruguay

[b] Departamento de Biodiversidad y Gestión Ambiental, Facultad de Ciencias Biológicas, Universidad de León, Campus de Vegazana, 24007 León, España

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ABSTRACT

In the countries of the Southern Common Market, historically, increase in exports has been based on the region's primary sector (the production and extraction of raw materials). In the last decade, this growth has been mainly due to the expansion of genetically modified crops. This greater share of unprocessed raw materials (agrocommodities) has been accompanied by an increase in imported agro-inputs, which are mostly subject to intellectual property rights (patents and plant breeders' rights). Unlike the Southern Common Market, the European Union shows an increase in research and development (R&D) associated with the boom of it's Knowledge Economy. A comparison of the number of intellectual property rights of both economic blocs is carried out with the purpose of analyzing this antagonism and its effects. Asymmetries are also analyzed by cross comparison of data from both intellectual property rights and R&D expenditure. The results indicate important relegation of research in the countries of the Southern Common Market. Growth and innovation of the agricultural sector in the Southern Common Market are being strongly affected by the tendency towards R&D expenditure in the European Union, thus deepening the asymmetry.

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## 1. Introduction

The introduction of genetically modified (GM) crops has modeled the economic growth of founding members of MERCOSUR[1] (Southern Common Market) - Argentina, Brazil, Paraguay, and Uruguay. By 2012, MERCOSUR soybean exports alone accounted for about 44% of the total volume traded globally (Uruguay XXI, 2013). The economic primary sector of the region (which consists of the production and extraction of raw materials) has therefore become responsible for the highest share of total exports (BID, 2013). Accordingly, there is a primarization of the economy.

The new economic scenario presented in MERCOSUR differs substantially from that of the European Union (EU). The EU has focused its strategy on investment in knowledge (Knowledge Economy). Thereby, the production of value added to

* Corresponding author.
*E-mail addresses:* lilianaterradas@gmail.com (L. Terradas-Cobas), carlos.cespedespayret@gmail.com (C. Céspedes-Payret), eluic@unileon.es (E. Luis Calabuig).

[1] MERCOSUR was initially formed by Argentina, Brazil, Paraguay and Uruguay. In later phases Venezuela and Bolivia have been incorporated, the latter in the accession process.

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products and services is growing at a faster rate than investment in means of production (Borrás, 2003; Dautrey, 2012; OECD, 2005). One of the EU's main purposes in doing this is to maintain competitiveness with regard to expanding economies such as China and India (Pavone et al., 2011), countries which are also making efforts to transform their economies into knowledge based economies (Wong and Goh, 2012). As part of this Knowledge Economy, the main development has been achieved by the Bio-Economy or Knowledge Based Bio-Economy (KBBE), strongly promoted by the European Commission (Clever Consult BVBA, 2010; European Commission, 2012; Felt et al., 2007; Levidow et al., 2012).

The KBBE is based on the manipulation, transformation, exploitation, and appropriation of biological materials made through new biotechnology, nanotechnology, and genetic engineering (OECD, 2009). The emphasis of KBBE is on the efficient and sustainable use of natural resources for the production of food and bio-fuels, among other goods (European Commission, 2005; Comisión Europea, 2010). The main political strategy of the KBBE is to facilitate new commercial products and patentable knowledge (Birch et al., 2014), therefore it is strongly dependent on resources assigned to R&D. For example, R&D expenditure in the EU reached, in just one decade (2004–2013), more than double the average expenditure of MERCOSUR (OECD, 2015). This EU investment increases its intellectual capital and at the same time, it demands the strengthening of intellectual property rights (IPR) to seize their benefits (Birch et al., 2010; European Commission, 2012). The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement) of the World Trade Organization (WTO) did not include developing countries in their rounds of negotiations.

As a result, differences between countries, such as their degree of technological maturity, were not considered (Abarza and Katz, 2002; Khor, 2001). It should be noted that all the MERCOSUR founding countries are not only TRIPs members, but have also ratified Act 78 of the International Union for the Protection of New Varieties of Plants (UPOV). Through this Act, farmers are prevented from using their own harvested seeds in future planting and just as GM seeds, any variety of these seeds is subject to IPR (patents and plant breeders' rights).

In this scenario MERCOSUR appears as an important EU's ally, as importer of goods and inputs for its primary sector (Porcile, 2011) as a result of the expansion of agrocommodities. Over the last few decades, MERCOSUR has recorded a significant increase in imports of agricultural inputs (seeds, machinery, fertilizers, pesticides) (BID, 2013) subject to IPR and therefore, royalties. The main source of these imports is the EU, especially medium and high technology manufactures which are more intensive in the incorporation of knowledge (UN Comtrade, 2016).

Although there is an open discussion in the literature around IPR records (patents, plant breeders' rights) as an indicator of the innovative capacity of a country, IPR records constitute a measure of value addition in the production of commodities. Therefore, despite their potential limitations, these records are important indicators with which to examine the links between environmental policy and technological change (Popp, 2005; Dechezleprêtre et al., 2011). As such, they demonstrate an inability to transform R&D investment in new goods and services or processes able to be patented and thereby establish a national technological capacity.

Despite the importance and derivations of the expansion of GM crops, their close dependence on R&D expenditure and the increase of IPR, the subject has not been thoroughly addressed. This lack of background is partly justified by the lack of disaggregated data in the main international databases. Given this reality, crosslinking data and the comparative analysis of trends allows us to recreate feasible, though hypothetical, scenarios.

In this paper, we have compared the number of IPRs (biotechnological patents and plant breeders' rights) granted both to MERCOSUR and to the EU and related them to their respective R&D expenditures.

## 2. Methodology

The comparative analysis includes two major trading blocs: on the one side, MERCOSUR, in which only it's initial member States were included (Argentina, Brazil, Paraguay, and Uruguay). These countries currently account for 90% of the cultivated area in South America with transgenic varieties. On the other side, the EU. All of it's 27 member States (to July 1st, 2013 prior to Croatia's membership) were included.

The analysis of data and information was primarily based on those provided by international or regional organizations such as the Statistical Office of the European Union (Eurostat), the World Trade Organization (WTO) and the World Bank (WB). A review and systematization of data and information collected was carried out. The period analyzed was 2000 – 2012.

Variables were selected according to the existence or accessibility of information on a regional and international statistical basis. These variables were: a) biotechnological patents, and b) plant variety protection in MERCOSUR and the EU.

a) In order to monitor the expansion of agrocommodities, the number of patents granted to applicants from MERCOSUR countries were compared with those granted to the ones from the EU. The information was organized from the database of the World Intellectual Property Organization, WIPO IP Statistics database (ipstatsdb.wipo.org). The definition of 'biotechnological patents' used by this organization includes those than which are not specifically agricultural (e.g. medical preparations containing peptides, biological treatment of water through microorganisms). Therefore we had to accept, this bias in this work.
   Documents from the WIPO database are registered through the Patent Cooperation Treaty (PCT) where Brazil is the only active member MERCOSUR. For this reason, it was only possible to compare the number of patents filed in Brazil by

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