Diffusion of new drugs: a review on the available empirical evidence focused on developing countries

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Preliminary remarks...

- particularities in healthcare, in its different levels, make the diffusion of new technologies, including new drugs, to assume very peculiar characteristics
- Such statement is also appropriate when it refers to the aspects that differentiate the market of the developed and developing countries
  - In the later ones: small markets, epidemiologic pattern in which contagious diseases and parasitic diseases are predominant, a deficient system of health attention and an ineffective regulatory system

Preliminary remarks...

- WHO (2001) presents a taxonomy of diseases considering the aspects related to the countries' income:
  - diseases of Type I would be the ones existing in rich and poor countries
    - Market mechanisms are capable of generating R&D investment and industrial production of drugs and vaccines
  - Diseases of Type II can also be found in rich and poor countries, however mostly in the latter ones (e.g. tuberculosis, HIV/AIDS)
    - R&D investments do take place, although below the necessary (mainly for the diseases that are more frequent in low-income countries)

Preliminary remarks

- The big problem of low-income countries would be related to diseases Type III (e.g., Trypanosomiasis and Leishmaniasis) that occur almost exclusively in these ones
  - R&D investments and production of new specific drugs for such group of diseases are very scarce, almost non-existing
- WHO taxonomy would be in accordance with GAP 10/90 (only 10% of the world expense in R&D directed to diseases that affect, mainly, 90% of the world population)

Aim of the paper

- The aim of the paper is to revise the available empirical evidence on the variables that affect the diffusion of new drugs, especially in developing countries
  - The results will be highlighted as well as the methodological procedures used by the referred authors

Method

- A review to describe the scientific literature available at CAPES, ECONPAPERS, Google Scholar, ISI Web of Knowledge, NBER and SciELO databases, through a simplified research by indexing search words on the title, abstract or keywords (Adoption; Diffusion; New Drugs; New Pharmaceuticals; Developing Countries; Pharmaceutical Industry)

- Relevant works having theoretical and/or empirical approach were included

Results…

- The literature review allowed the identification of factors related to the process of new drugs diffusion in eight specific categories:
  - (a) patients' socioeconomic status and education level; (b) network effects of information; (c) health insurance-plan characteristics; (d) severity of patient disease; (e) clinical practice (physician prescription); (f) intellectual property rights; (g) regulatory environment; (h) and market characteristics

Results

- According to the literature reviewed, the investigation of the variables that affect new drugs diffusion can be divided into two groups:
  - (a) the first one refers to works in which the research is based on the review of empirical texts focused on a particular variable; (b) the second group deals with empirical works that mainly use econometric or simulating models and diffusion models

Factors related to the process of new drugs diffusion

Factors	Sample of Authors	Some results
(a) patient's socioeconomic status and education level	e.g., GOLDMAN & SMITH, 2005; LLERAS-MUNEY & LICHTENBERG, 2002	Ambiguous evidences; the education level may help on adopting new drugs at microdata (individual data) level
(b) network effects of information	e.g., PAPAGEORGIU et al, 2007; BERNDT et al, 2003; BERNDT et al, 1999	Technology transfer (imports and information net) improves health status in non frontier countries
(c) health insurance-plan characteristics	e.g., CROWN et al, 2004	If the earnings from the medical procedure are higher than its marginal cost, technology diffusion tends to take place
(d) severity of patient disease	e.g., CONG, 2009; VALENSTEIN et al, 2006	Early adoption may be associated with clinical factors;
(e) clinical practice (physician prescription)	e.g., VAKRATSAS; KOLSARICI, 2008; FOOTE; ETHEREDGE, 2000; STEFFENSEN et al, 1999	Due to severity of a disease or physician's behavior, the market may be divided into an early adopters market and a late adopters market, it affects the pattern of diffusion

Factors related to the process of new drugs diffusion

Factors	Sample of Authors	Some results
(f) intellectual property rights	e.g., LANJOUW, 2003; BORRELL, 2003	Patents seem to have a positive effect on launching new drugs in developing, nevertheless the most important variable is the differential prices through different markets
(g) regulatory environment	e.g., ATUN; GUROL-URGANCI, 2007	Regulatory environment influences in a different way the different markets, according to their income level and market potential.
(h) and market characteristics	e.g., VAKRATSAS; KOLSARICI, 2008; DESIRAJU et al, 2004; KREMER, 2002	The diffusion speed grows due cumulative sales so previous users' database is an important factor to diffusion; rich countries are early adopters of new technologies; diffusion speed is lower in developing countries;

Remarks…

- In general, such literature can be considered very scarce
- That fact is more evident in case of developing countries.
- In these ones, the evidence is limited to only two of the most commonly related factors to the diffusion of pharmaceutical novelties:
  - intellectual property rights and pharmaceutical market characteristics.

Remarks

- It was found that the papers reviewed presented a diversity of objectives and methodological procedures, although they were generally based on the mainstream of economic thought
- Such diversity did not allow the direct comparison of the different texts herein studied and their findings are limited to the particular characteristics of their study object.

Despite the limited evidences some statements about developing countries would be:

- Property rights do not assure the introduction of a new drug in a developing country. Even in indian market, where the infant industry is capable of rapidly copying trademarks drugs (Lanjouw, 1998)
- When lauching a new drug in developing countries the property rights seem to be less important than the differential prices through different markets
- Maybe the three types diseases from OMS should be restated in a broader sense, including the delay on launching drugs in poorer countries

On developed countries

- Affluent countries are early adopters of new technologies, but acess to it become less dependent to income with time (Slade & Anderson, 2001)

- Diffusion speed is higher in richer countries (Desijaru et al, 2004).

- In more affluent markets the greater the population share of the middle class, the higher the probability of a new drug to be launched (Lanjouw, 2005).

On developed countries

- So, apparently, at macrodata level social inequities could reinforce inequities in acess to new drugs

- At microdata level (individual level), higher educational level seems to be associated to adopting new medical technologies – it may suggest a channel of spreading inequalities when launching a new drug. Nevertheless, the evidence is not conclusive

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