

## **Evidence and prospects of shortage and mobility of medical doctors. A literature survey<sup>1</sup>**

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### **Abstract**

This paper focuses on the shortage in health workforce, its causes and its consequences. The implied mobility is also introduced.

Series of issues are introduced to better capture the global prospects facing the health system. A literature review survey on the above dimensions is the main source of information used in this paper. The attained outcomes confirm the existing increasing current and future trends of shortage and mobility of the health workforce with emphasis on medical doctors.

The expected consequences on developing countries are discussed in relation to the increasing demand for healthcare but also to the technological changes taking place at the level of the sector and in its environment.

**keywords:** Shortage-Labor supply-Backward Bending Labor Supply-Migration-Brain drain.

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### **1. Introduction**

This paper shows how migration of medical doctors is critical to all countries. While the literature on brain-drain has had pessimistic policy outcomes, the relatively new literature on both brain-gain and brain-drain suggests new avenues for further promising policies. The global health systems as well as the specificities of health care require further collaborative actions and global strategies between migrant receiving and sending countries. The present paper builds on previous contributions by Driouchi, Baudassé, Zouag and Boboc (2009) besides the research on the migration of medical doctors (Driouchi & Kadiri, 2011). It also accounts for the contributions of Driouchi, Zouag and Malki (2011) and Driouchi (2014).

Issues are discussed with first, the introduction of shortage of medical doctors. This is followed by a focus on some factors that could lead to this shortage before discussing migration and then by the on-going related approaches and policies. Such components are likely to allow for an overall understanding of the links between shortage and migration besides the overall policies governing

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education, migration and health.

This is part of the challenges faced by health workforce and that has been identified and excessively discussed with the publication of the WHO report (2006) with the analysis of the patterns, issues and trends related to the human resources operating in the health systems. Among the background papers in this report, there is the one by Dal Poz, Kinfu, Drager and Kunjumen (2006) that deals with counting health workers through data with showing the global results. But, the most promising publication on labor markets for the health workforce is the book edited by Soucat, Scheffler and Ghebreyesus (2013). While the book focuses on Africa, it provides important insights about the analysis of the health systems.

Ranson, Chopra, Atkins, Dal-Poz and Bennett (2010) argue that since human resources account for approximately 70% of recurrent expenditures in most health systems, inadequate human resource training, regulation, distribution and management can have enormous implications. To the authors, poor developing economies suffer from shortage of health-care providers and from the poor distribution of providers within the same country. These concern disparities in the distribution of health workers between regions, between rural and urban areas, and between public and private sectors. In Algeria with 8 % of the population in Algiers, 24% of specialist physicians are located in this city. Similarities are found in other countries (Argentina, Egypt, Uganda and Tanzania). The working time, the levels of efficiency in private and public sectors are also discussed as expressions of implicit discriminations. But, to the authors this is a more general trend that is exaggerated in poor developing countries. Ranson et al. (2010) have discussed the priorities for research on human resources for health in low and middle income countries. The authors use interviews of different stakeholders to find out about the major problems facing health workers and the type of research priorities needed. Twenty-one research questions are identified with some having never received attention in the reviewed literature. They include incentives for retention and attraction of health human resources to underserved areas, the impacts of multiple employments and the use of optimal incentives to enhance quality of health care. A clear consensus about the type of policy problems faced by different countries and the nature of evidence needed to tackle them.

Humphreys, McGrail, Joyce, and Scott (2012) analyze the use of recruitment and retention incentives with applications to the targeting of rural areas in Australia. They suggest this new geographical classification that provides a better basis for equitable resource allocation of recruitment and retention incentives to doctors based on the attractiveness of non-metropolitan communities, both professionally and non-professionally, as places to work and live. These means are proposed as alternatives for reducing the current levels of disparities between urban and rural areas but also different rural regions of Australia.

These disparities are also observed in other developed countries including those

of OECD (2013). Different papers have been devoted to the situation in many countries. They all insist on the procedures to generate more incentives to attract and value the health services with a major focus on the importance of research. This latter needs to address health human resources as they are major needs to know the best ways of ensuring local and global policies for a better access to health.

Sheikh, Boerma, Cometto and Duvivier (2013) consider that the availability, distribution, capacity and performance of human resources for health varies widely, and many countries have fewer health workers than needed for coverage of essential health services. The authors say that signs of progress are emerging, though several countries that are successfully addressing their problems in the area. Signs of progress resulting in improvements in health outcomes are observed. But these new gains are not sustainable as shortages and inequitable access to health workers may jeopardize the implications of these efforts.

Love (2012) discusses the means for the promotion of R&D in health as a way to reduce shortages in the medium and long terms. The author considers that the primary mechanisms to support such research are an obligation on convention members to invest a certain percentage of national income in R&D in addition to a fraction in a new multilateral pooled funding mechanism. The proposal for a convention also included several other norms, such as a requirement to delink R&D costs from product prices, to enhance the innovative capacity of developing countries and transfer technology to such countries, and to expand access to scientific knowledge.

Schweitzer and Synowiec (2012) are examples of authors that count on the role of new health and also information technologies to ensure better solutions to health care. They focus on m-health (or mobile health) and e-health (i.e. is the use of information and communication technologies for health). These are considered to have the potential to overcome traditional obstacles to the delivery of health services to the poor in lower and middle-income countries— issues related to access, quality, time, and resources. But, to the authors, there is little evidence as to whether the expected benefits and savings can be actualized on a large scale. As a first step to developing investments on m-health and e-health, the paper outlines some of the key economic and financial questions that need to be answered in the context of developing economies.

Telemedicine (Njikang, 2012), is concerned with the provision of clinical services at distance. It could be also considered as ways to reduce shortages in medical doctors. Remote areas could be targeted to use these technologies and compensate for the reduction of local medical services.

The above contributions show that shortage of medical doctors besides their migration but also research related to human resources and new technologies are important interdependent elements that need to be searched form different publications. Six interdependent sections form the core of the present paper. They successively deal with shortage, its causes, the patterns of migration

besides migration policies and the positioning in relation to the literature on brain drain with the specificity of brain drain in the health system.

## ***2. The increasing shortage of medical doctors***

There are very important reports by international organizations and mainly by the World Health Organization (WHO, 2006) that address the global and country shortages in health workforce. O'Brien and Gostin (2011) produced a good report dealing with health worker shortages. These authors consider that the world is experiencing a critical and growing shortage of health workers particularly in the poorest countries. They claim that the global human resource shortage is certainly much greater than 4.3 million health workers. To the authors, this shortage includes more than physicians and nurses. It includes also pharmacists, dentists, laboratory technicians, emergency medical personnel, public health specialists, health sector management, and administrative staff. The WHO estimates that there is a shortage of about four million health workers needed to deliver essential health services, and has called for immediate action to resolve the accelerating crisis in the global health workforce.

Shortages and imbalances of medical personal have been seen as an international problem with the works of Mullan, Politzer and Davis (1995), Health Canada (2005) but also by Miller, Langesen, Lee and Mick (1998). Zurn, Mario, Dal Poz, Stilwell, and Orvill (2004) suggest that economic theory considers that a skill imbalance occurs when the quantity of a given skill supplied by the work force and the quantity demanded diverge at the existing market conditions. These authors emphasize that labor market supplies and demands for occupational skills continuously fluctuate implying labor market imbalances or shortages.

In theory, all economies are facing shortages in medical doctors as these deficits relate not only to aggregated needs of growing populations, but also to the coverage of specific demands in well defined areas and in particular medical domains. Since shortage of medical doctors is universal, it is directly affecting the reforms aiming at making universal health care. The deficit of medical doctors is also affecting the universal insurance health care coverage. On the other hand, the boosting of universal health care and health insurance lead to further shortages in medical doctors. Smith (2008) among others, talks about global shortage in health care professionals and that Governments and health rights movements are both responsible of this global shortage. Other authors such as Noree, Chokchaichan and Mongkolporn (2008) have been insisting on the unequal distribution of human resources of health that can generate abundance for some but shortage for others. The spatial distribution of medical doctors between regions in the same economy and between urban and rural areas can

also show important deficits of medical doctors.

If health emergencies can be easily included in the identification of shortages, the needs of some specialties and the waiting time of patients are among the factors that can also express acute shortages in medical doctors. Seward (2007) has claimed that the waiting time for medical doctors can be more than seven weeks in the Boston area, in the USA. Other studies show that waiting can lead to the progression of diseases, which leads to further social and economic burdens. Abdullah (2005) investigates the possible operational problems that may lead to excessive waiting time for patients in Malaysia. He shows that 73.2% of the patients spend between 4 and 5 hours waiting to obtain a treatment from a doctor. He also demonstrates that this long time gives a negative perception on the quality of services in hospitals. Merritt Hawkins and Associates (2009) examine patients waiting times in fifteen states in the USA, with a focus on five medical specialties. This study shows that waiting times differ depending on the medical specialty and also from one city to another. In addition, this study underlines that despite the high number of physicians per capita in the cities of USA; many of the patients experience very long waiting times. For instance, the average time in Philadelphia is 27 days and in Los Angeles is 24.2 days. Another contribution based on OECD countries suggests that while the waiting time is a serious health policy issue in Australia, Canada, Denmark, Finland, Ireland, Italy, Netherlands, New Zealand, Norway, Spain, Sweden, and United Kingdom, it is not that high in Austria, Belgium, France, Germany, Japan, Luxembourg, Switzerland, and the United States. The main reasons for this, reside in registration time and the limited medical staff (Abdullah, 2005).

The growing progress and the new discoveries in health technologies are also likely to increase the demand for new medical areas implying an enhancement of the level of shortages. While all countries are concerned with these shortages, developing economies are likely to suffer the most from their implications relative to developed countries. These latter economies have better planning and management of their medical human resources in both public and private health sectors. The limited planning and management is itself among the sources of emigration of medical doctors from developing to developed economies even under a most pronounced shortage in the first types of economies. Besides that, developed economies do attract with their overall working and living conditions. But there are also differential incentives between developed countries. For Skinner (2002), the design of Medicare in Canada is considered as generating a monopoly provider of publicly-financed health insurance and as a coercive regulator of the health services industry. The author considers that this creates incentives to reduce labor wages in order to contain costs. The wage differentials between Canadian and American health professionals create a powerful incentive for Canadian medical personnel to emigrate to the USA. To the above author, this is continuing to produce loss of medical doctors and nurses contributing thus to a labor shortage in the health care system and reductions in

public access to health services that may be negatively affecting health outcomes in Canada.

In practice, each country has plans for its medical human resource needs and also programs for their fulfillment. But, these plans are contingent on risks and uncertainties that take place locally and at the aggregate levels. Medical education is among the sources that are assumed to help cover these needs. But, risks related to emigration are likely to be limiting the realizations of these plans. At the same time, compensations of the eventual losses from emigration cannot prevail unless possibilities of attraction of immigrant medical doctors are embedded in the staffing plans, both at the public and private health sectors. This attraction can take place in developed countries and under some co-operation and bilateral arrangements in some developing economies. Richer developing countries can proceed to covering their shortages through open, co-operative and direct hiring of medical doctors. But, most developing countries may not be capable of offering the latter options. For these countries, emigration of medical doctors is synonymous to real shortages as increasing population health needs is not covered under a decrease of health staffing. Further shortages in medical doctors can be observed in these economies placing thus more risks on the health of their populations.

The above descriptions and trends are supported through the use of aggregate information about world shortages and density of medical doctors. The world map of shortage of medical doctors (largely available on the Internet) highlights the fact that the shortage of medical doctors is present all over the world, but can be described as critical in most developing countries and poorer regions such as in Sub-Saharan Africa and South Asia. It is also highly expected to be occurring in countries such as Morocco, Indonesia, Costa Rica, and Peru.

When referring to the density of medical doctors per country and region, this shows an overall high numbers of inhabitants per doctor. This is larger in developed countries but also in some developing parts of the world. In sub-Saharan Africa, it can attain 50,000 inhabitants for one doctor.

Besides the above, shortage of medical doctors is more sensitive at the individual and aggregate levels as it affects human lives in comparison with deficits in other services that can either be compensated for, or have limited short run effects. This can be the case deficits in engineers and in teachers and faculty members but shortages in medical doctors are more critical to any economy. The emigration of medical doctors is consequently more critical than that affecting other types of skills.

While the development in international trade in services is promising as it can provide solutions to local and national deficits and as it can cover series of domains that need expertise and access to skilled labor, the area of medical doctors can be hardly concerned with this trade. Special arrangements and requirements are needed in this area even with the development of advanced technologies.

The statistics about total health workforce, health service providers and health management and support workers as provided by World Health Organization (WHO, 2006). The claim is that the total health workforce is estimated to be 59,220,000 people among whom 64.76% are in Europe and Americas. The health service providers are estimated to be 3.45% in Africa as compared to 31.57% in America. The percentage of total health workforce is estimated as 17% in Africa, compared to 43% in America. These figures highlight the prevalence and universality of health care shortages, but their exaggeration in most developing economies.

These shortages are certainly among the causes of mobility of health workforce and especially of medical doctors as there are countries that can offer better incentives and thus better conditions to reduce their deficits.

Other authors and publications are still addressing the issue of shortage in the health workforce with its implications on the provision of health care.

### ***3. Labor occupations, backward bending labor supply curve among the causing factors***

The obvious source for the reduction of shortage in medical doctors is in relation with the outputs of medical education. Any shortage in the number of medical doctors, leads to deficits in the number of medical doctors through time. Apart from this, other factors have been discussed in the literature. Besides that, the labor supply of medical doctors has appeared to follow the normal trend expected relative to changes in incentives. Andreassen, Di Tommaso and Strøm (2012) focus on a longitudinal analysis of the labor supply of married physicians in Norway from 1997 to 1999. The model utilized for estimation considers that physicians can choose among 10 different job packages which are a combination of part time/full time, hospital/primary care, private/public sector, and not working. Their current choice is influenced by past available options due to a taste persistence parameter in the utility function. The estimation accounts for the budget constraint, including all features of the tax system. The results imply that an overall wage increase or a tax cut moves married physicians towards full time job packages, in particular to full time jobs in the private sector. The overall and aggregate labor supply elasticities in the population of employed doctors are rather low compared to previous estimates. Such a role is not all the time observed as discussed in the following papers.

In a very interesting recent book by Barnow, Burt, Trutko and Pitak (2013), employment shortage and occupations are discussed in different book chapters. Many concepts tried to explain the term "labor shortage" but are finally judged irrelevant to the study of occupational shortages. These refer to series of

approaches defined as based on sustained market disequilibrium between supply and demand in which the quantity of workers demanded exceeds the supply available besides the willingness to work at a particular wage under specific working conditions. The causes of labor shortage are attributed to the geographic scope of the shortage, the period of the shortage, its severity and the subspecialty of shortages. This is the key determinant of whether there can be shortages for some parts of an occupation besides the consideration of the substitution effects. If not, a shortage can exist within an occupation while other subcategories are in equilibrium or even in surplus. According to the book, analyzing the causes of labor shortage is important because it helps in awareness of the appropriate market signals to look for in assessing whether or not shortage exists and to identify and assess potential public and private policies for dealing with shortages. Among the factors that are cited to cause labor shortage, there is the phenomenon of backward bending labor supply that occurs in situations where workers are free to allocate their time between the professional and other alternatives.

There are two main effects related to determining labor supply. The substitution effect states that a higher wage makes work more attractive than leisure. Therefore, supply increases. The income effect states that a higher wage means workers can achieve a target income by working fewer hours. Therefore, because it is easier to get enough money they work less. When the wage is low, the substitution effect may dominate. As wages increase, the income effect can start to dominate for a worker, when there is a choice between work and leisure. If wages increase, then work becomes relatively more profitable than leisure (substitution effect). However, with higher wages, he/she can maintain a decent standard of living through less work (income effect). The substitution effect of higher wages means workers will give up leisure to do more hours of work because work has now higher rewards. The income effect of higher wages mean workers will reduce the amount of hours they work, because they can maintain a target level of income through fewer hours.

These effects can be translated into other economic activities where labor has more choices to ensure economic activities, such as in the paper by Gautam, Strandand and Kirkley (1996) on leisure/labor tradeoffs in fisheries. Economists have understood that the open-access nature of fishing grounds can cause the long-run fishery supply to bend backward. There is also increasing speculation that fishermen respond to falling output price either by increasing or decreasing effort, depending on the circumstances. This suggests a short-run backward-bending supply of fishing labor. A dynamic, utility-theoretic model of fishermen's behavior is developed to address this possibility. The model highlights both contemporaneous and inter-temporal tradeoffs between labor and leisure. The model is tested and the results indicate that the short-run labor supply in fisheries may exhibit backward-bending properties. In addition, changes in current prices may trigger changes in expectations of future prices, causing

potentially greater counterintuitive behavior. These results challenge many traditional regulatory strategies that address problems of open access.

Brown and Lapan (2007) introduce a model of the supply of physicians' services based on the assumption that physicians are price-taking utility maximizers. The paper assumes that physician's services are produced using physicians' labor and purchased inputs. It shows that the impact of changes in final product or input prices on the supply of physicians' services depends on the physicians' labor-leisure choice and on the degree of substitutability between physicians' labor and purchased inputs. The empirical results presented indicate that the physicians' labor supply curve is backward-bending, but that the supply curve of physicians' services is positively sloped.

Green (1978) addresses the theoretical models designed to ascertain the existence of a variable level of physicians' activity in shifting the demand of their patients. Two basic approaches are followed: equilibrium models of the demand for health care, and disequilibrium models. Within the former category, both competitive and monopolistic behaviors are studied. Using the monopolistic model, a statistical test of the hypothesis of "no induced demand" is constructed, and fails to reject it. The disequilibrium analysis of other writers is analyzed and an alternative specification of such a model is set out.

Keher (1976) looks at the income differences between men and women physicians. These are analyzed using data from the American Medical Association's 1973 Eighth Periodic Survey of Physicians. While women tend to possess less favorable professional characteristics in terms of income-earning potential, the returns to many characteristics associated with higher incomes are greater for women than for men. Additional evidence on differences in weekly hours worked is presented in an effort to explain the lower incomes of women doctors. The woman who becomes a physician gains entrance to one of the highest paid of all professions. Yet, even within medicine, women's incomes are considerably lower than those earned by men. This paper reports on an analysis of incomes from medical practice earned by men and women physicians based on data obtained from a recent American Medical Association (AMA) survey.

Boulier (1979) investigates the supply decisions of medical practitioners while many previous studies have examined the relationship between hours worked by dentists and physicians and net income per hour. There are two important short-comings to previous approaches and estimations. First, variations in net income per hour among self-employed practitioners (the majority of dentists and physicians) are caused not only by variations in the price of output but also variations in hours worked, quantities of other inputs employed, and the prices of those inputs, so that the relation between hours worked and net income per hour is complex and not analogous to that between hours worked and wage rates for employed persons. Second, the results of these studies provide only inferential evidence about the supply of one of the inputs into the production of

medical services-not output. It is conceivable, for instance, that an increase in the price of output might result in a decrease in the number of hours worked by a dentist or a physician, yet result in an increase in output if the practitioner is led to substitute a sufficient quantity of other inputs (e.g., auxiliary personnel) for his own time. The next section of this chapter outlines a theoretical model of a dentist's practice which describes the relations among the price of output, the prices of inputs, hours worked by the dentist, the quantity of inputs used, and the supply of output. The succeeding section presents the results of an empirical investigation of the determinants of hours worked and the supply of output by non-salaried dentists.

Brown and Lapan (1972) comment the article of Feldstein (1970) who attempts to explain the pricing of physicians' services in the United States between 1948 and 1966. In his attempt to measure the demand for physicians' services, Feldstein (1970) finds a positive price coefficient. Further, since his estimates imply a backward-bending supply curve for physicians' services, he infers that government policies to reduce price inflation, may increase excess demand but will not decrease and may even increase the quantity of physicians' services provided.

Ellis (1981) introduces the debate over the last several decades about the backward-sloping supply curves of labor in Africa. This debate has occasioned much confusion not only as to what has in fact been observed, but confusion within and without the discipline of economics as to how the behavior might best be interpreted. Vahovitch (1977) looks at how physicians do as they tend to cut down on their work hours and weeks, and, if they do, how this will affect the supply of services available to their patients. These questions open up an important area of research, because the information gained can be extremely useful in estimating accurately the future supply of physicians' services and in determining government policies directed at affecting that supply. The hypothesis that an individual will choose an extra hour of leisure over an extra hour of work, once he/she reaches a certain wage level, is tested empirically by Vahovitch (1977). If the supply curve for a physician's market time is backward-bending, the supply of services offered may be dramatically reduced as a consequence of rising affluence.

Jeon and Hurley (2010) show that an effective solution to the problem of access to physician services in Canada must extend beyond an over-exclusive focus on the number of providers to consider the behavior of physicians in greater depth. The amount of labor and associated services supplied by physicians depends importantly on their attitudes regarding work, on practice and non-practice income opportunities, and on the policy environment in which they practice. Hence, the amount of labor supplied by a given stock of physicians can change over time. Only by considering the full range of factors that affect the labor supply of physicians can we effectively plan for physician resources.

Mitchell (1984) considers that because of the large public investment in medical

education, it is important to understand why women physicians work significantly less than men physicians. National survey data on office-based private practice were used to estimate (using two-stage least squares technique) hours and weeks worked for men and women physicians separately. Contrary to conventional wisdom, shorter work weeks for women physicians are not the result of child care responsibilities. Nor would higher earnings encourage women physicians to work longer hours. Instead, we found significant work reductions among married women physicians (but not men), implying subordination of careers by women where combined family incomes are high.

Chanel, Paraponaris, Protiere and Ventelou, (2010) devote their paper to the analysis of the General Practitioners' (GPs) labor supply, specifically focusing on the physicians' labor supply responses to higher compensations. This analysis is mainly aimed at challenging the reality of a 'backward bending' form for the labor supply of GPs. Because GPs' fees only evolve very slowly and are mainly fixed by the National Health Insurance Fund, the authors design a contingent valuation survey in which hypothetical fee increases are randomly submitted to GPs. Empirical evidence from 1,400 French GPs supports the hypothesis of a negative slope for the GPs' labor supply curve. Therefore, increasing the supply of physicians' services through an increase in fees is not a feasible policy.

Kleven (2009) wants to see if there have been any changes in the labor supply of hospital physicians after the implementation of the hospital reform in 2002. Several studies have shown that physicians spend less time on patient related work and that the productivity has decreased.

The data material in this thesis is based on second handed data. Two surveys were conducted in 2001 and 2006 on randomly collected hospital physicians by the Physician register. The total respondents were 1131 physicians in 2001 and 1298 physicians in 2006.

Hospital physicians have decreased their total working time with approximately 1 hour in 2006. This may be due to a shifting trend in the society where people are valuing more leisure, and less working time. While decreasing the total working time, the hospital physicians have increased their amount of patient related work by approximately 3 % (1 hour) in 2006.

There have been modest changes in working time, with approximately 1 hour decrease in total working hours in 2006, and approximately 1 hour more on patient related work in the same year.

It cannot be concluded that the hospital reform have had any effect on working hours and time allocation, but there are indications in the study that trends and tendencies towards more family life and leisure are influencing the labor supply among physicians.

Clerc, L'Haridon, Paraponaris, Protopopescu and Ventelou (2010) present an adaptation of the labor supply model applied to the independent medical sector. First, the authors model simultaneous decisions on both the leisure time and the consultation length for two payment schemes that are fixed and unregulated

fees. The objective of this econometric study is to validate the theoretical prediction that doctors under unregulated-fees may make choices about the length of patient consultations independently of their personal leisure decision. Indeed, according to the empirical results, the bidirectional link between leisure choice and consultation length are verified with fixed fees but does not hold any longer under unregulated fees. These findings can be seen as a necessary but not sufficient condition to legitimize unregulated fees in general practice.

#### **4. Mobility of medical doctors**

Migration of highly skilled labor is an area of interest to policy makers all over the world. Historical records show that this phenomenon represents the concern of many countries and is subject to different interpretations, disputes and expressions of fear (Bhorat, Meyer, & Mlatsheni, 2002). International migration among skilled workers shows a trend of noticeable growth in last decades: globalization, economic growth and the explosive growth in information and communication technologies are some of the reasons suggested by Bhorat et al. (2002). In addition, data from OECD (Organization for Economic Co-operation and Development) countries indicate that the medical doctors initially trained abroad make up a significant percentage of the medical doctors. Most them are (21%) in Australia, (23%) in Canada and (9%) in Finland.

An interesting map could be extracted from the 2009 Human Development Report (HDR). It illustrates international migrants' movements. The map shows important intra-regional movements within Europe, Asia and Africa; whereas this movement is less important in the Americas and Australia. It also highlights important migrants outflow from countries with medium to low human development index toward countries exhibiting high human development index. Incentives to migrate differ from an individual to another. Some migrate looking for better financial conditions; others seek higher standards of living, better education (visa and immigration services, 2011). These can be grouped into push and pull factors between the origin country and the country of destination. However, in the case of highly skilled labor, the salary gains are noticeable. Data from the 2009 HDR show the gaps in average professional salaries for selected country pairs for different specialties, namely engineers, physicians, nurses and professors. Physical doctors earn over 100 thousands US dollars in Canada per year compared to about 10 thousands per year in Zambia. Immigrant doctors from Ivory Costs to France can have up to 60 thousands US dollars of annual salary gain.

Salary gains can be at the origin of remittances. In fact, as salary gains are considerable for skilled workers, part of the income tends to be expatriated to

worker's home countries. In fact, data from the Human Development Report show flows from international remittances in the years 2006-2007. These data highlight the presence of intra-regional remittances especially at the level of Asia and Europe. In addition, remittances from North America totaled 30.1 billion US dollars toward Asia, 17.3 billion toward and 36.3 billion toward Latin and South America. Other income outflows happen between Europe, Africa and Asia. The 2002 World Bank report highlights that countries in MENA region are among the most important countries to receive remittances. However, it is argued in the literature that remittances from skilled labor are relatively smaller as shown in Faini (2006), but also in Siddiqui and Chowdhury (2003). Skilled individuals are more likely to spend longer time periods in the host country and are more likely to bring their family members to the host country, as found in Faini (2006). Therefore, salary gains and possibility for remittances among other incentives that encourages doctors and other health care professionals to emigrate from their home countries to other places. Ryan (2011) has looked into the different push and pull factors leading to the emigration of medical doctors. The push factors include low salaries, job conditions, risks, and limited implementation of human rights. For the pull factors, they include economic reasons (better pay & improved socio-economic status), access to professional development opportunities, furthering of career, easy access to communication and technology, promise of better education for children, job security, and aggressive recruitment by other countries.

Pull and push dynamics between developed and developing countries have historically generated disparities between stocks and flows of health care professionals in and between these countries. In fact, Mejia and Pizurki (1976) in their WHO study looked at the global flows of physicians and nurses and showed increased disparities between developed and developing countries. Existing data indicate the total stock of physicians and nurses in both classes of countries while distinguishing the inflows and outflows. The above study shows that 89% of total inflows of health care professionals migrants are into the developed countries; whereas, 56% of total outflows are from developing countries. In addition, the same authors argued that between, 1960 and 1970, about 16% out of the total stock of physicians were on the move, mostly migrating to the US and UK from countries like Ireland, India, Sri Lanka, the Philippine, Korea and Latin America.

Despite the important migration among health professionals around the world, the flows are far from being free. There are direct and indirect costs that migrants face in the process of settling in their new destinations that can be considered as a barrier to migrate. In fact, Beine, Docquier, and Özden (2011) argue that migrants face significant legal barriers, social adjustment costs, financial burdens and many uncertainties while they are trying to live in their destination countries. The authors distinguished two main costs: assimilation costs that include time and effort needed for the migrant to adjust to new social

and cultural norms, in addition to the new linguistic and economic environment. "Policy" costs include all the legal entry barriers as well as the work requirements the migrant needs to deal with before arriving to destination (Beine, Docquier, & Özden, 2011). Some might argue that legal requirements might be less tough on skilled migrants, but they are still significant enough to hinder their free movement.

Even when considering that immigration policies in receiving countries are tilted in favor of skilled migrants (Beine, Docquier, & Rapoport 2003) compared to non skilled, the legal and professional requirements of the medical profession can be real barriers for the medical doctors to exercise in a developed country. The entry restrictions are justified in order to assure the quality of professional services as argued by Garoupa (2006). In Germany for example, it is very difficult for a foreign doctor (from non EU countries) to get a work permission to work with a German health institution. Foreign doctors need to have a residence permit, working permit, and the license to practice medicine. This license can only be given if the doctor/applicant works with a preliminary permit between 12 and 18 months in a hospital. In addition, doctors have to demonstrate sufficient knowledge of German language (German Medical Association, 2011). Therefore, despite the promising incentives of migrating to Germany, doctors face legal and professional constraints that make it extremely difficult if not impossible to be a practitioner in developed countries.

Studies suggest that physicians move abroad for training purposes to seek out additional professional qualifications or to gain experience with innovative techniques in the medical field (Mejia & Pizurki, 1976). For Ryan (2011), medical doctors emigrate from developing countries to acquire skills that are available in more developed economies. According to this study, doctors initially leave as students, but after few years, they become established emigrants for different reasons. This creates a cycle where more skilled workers from the home country are disposed to join them (Ryan, 2011).

Trade in higher education services has known a considerable growth in volume and value (Bashir, 2007). This trade is taking two main forms: students moving to universities abroad and foreign universities are providing higher education partnership with local institutions, through in country presence or virtual presence, as presented by the author. Statistics by World Bank show that between 1999 and 2004, Sub-Saharan African countries showed a strong 77.8 percent increase, MENA and Eastern and Central European states had increases of 57.9 and 58.3 percent respectively, while both North and Latin America had a 50 percent increase in students studying abroad (Bashir, 2007). Trade in education services combined with higher incentives and work opportunities can push international students to become recognized emigrants. In the UK for example, doctors who came to attend postgraduate training make up 37.3% of all physicians in National Health Service (NHS) in the year 2000. Migrating while being a student in a medical school the elimination of the professional

constraints foreign doctors are subject to in host countries.

The elements discussed above among others, provide evidence about medical doctors' emigration to different parts of the world. Following the increasing trend of this phenomenon, the concept of trade in health services emerged. In fact, Chanda (2004) pointed out that in OECD countries only, health care sector generates about 3 trillion US\$ per year, and this amount is expected to raise in the following years as the demand for health care services increases (Bureau of labor statistics, 2010). The economic globalization in addition to the revolution in information technologies have urged and encouraged international trade in health services. Therefore, as any traded service, there are modes of service supply used in the estimation of trade in health services. Chanda (2004) has looked into these modes and summarized them as follows. Cross-border delivery of health services (Mode1) concerns the shipment of laboratory samples, diagnosis, clinical consultations and second opinions via traditional mail channels and electronic ones. The author argues that tele-health services are popular among countries, for example, Indian doctors provide tele-pathology services to hospitals in Bangladesh and Nepal whereas some hospitals in the US provide tele-diagnosis and consultation services to other hospitals in the Central America and Eastern Mediterranean (Chanda, 2004).

The second mode of interest to trade in health services is medical tourism. This phenomenon occurs when people from developed nations travel to other countries around the world seeking medical treatments, due to the high costs of the same medical service in their own countries. Chanda (2004) argues that, in addition to the high costs of health care in countries like the US and UK, the convenience of international travel via air, the rapid advancement of medical technologies in less developed nations all around the world, the exotic and the fun experience of traveling abroad have all contributed to the growth in medical tourism. Herrick (2007) pointed out the main destinations for tourists seeking health services. He claimed that most Americans look for treatment in Latin and South American countries, namely Mexico, Brazil and Argentina. India and Thailand are popular destinations for serious medical procedures as they benefit from high tech facilities. Other popular destinations especially for Europeans include East and Central Europe, Singapore, and South Africa.

Mode 4 concerns temporary movements of health care professionals. For Chanda (2004), this area of international trade is gaining importance in developing countries. This mode is about the outflow of qualified medical personnel from their home countries, usually seeking better living standards and career development opportunities in industrialized and rich countries. The author argues that this migration alleviate the shortage at the level of developed countries and benefits the source countries in terms of remittances. The movement is not limited to South/ North, but can occur within developed nations. For examples, given the shortage of medical doctors in Portugal and the high number of doctors in Spain, many Spanish doctors have moved to work in

Portugal (Garoupa, 2006).

Facing migration and the global shortage in medical doctors, many countries have been reacting around the world to put in place global policies that will help promote health care through medical doctors.

### **5. *The role of migration policies***

The related literature suggests that migration is not a free process since it involves many direct costs, indirect costs, social and legal barriers that migrants are exposed to while settling in the new destination. As migration engages human capital, it is of a great concern to policy makers. High skilled emigration benefits from special attention as it is believed to be bringing gains to the destination country while having important direct and induced negative effects in the country of origin. Beine, Docquier, and Özden (2011) confirm that there is evidence of policy effect on migration; although this effect is larger for unskilled labor and those originating from low income countries, it is still significant for skilled individuals. Bhargava, Jamison, Lau, and Murray (2001) argue that emigration of medical doctors deserves special attention from policy makers as it involves connections between population's health and economic growth especially at the level of developing countries.

In fact, Bhargava, Docquier and Moullan (2011) argue that the supply of medical doctors in developing countries is highly linked to the improvement of human development indicators.

Stark and Fan (2001) found that when developing economies open up to migration of skilled workers, unemployment is exacerbated. Their study demonstrates that government policies with regard to employment affect policies to restrict or open up to skilled labor migration, medical doctors included. The reasons discussed above give strong arguments of the extent to which migration of medical doctors and critical and how it affects development, global health, and unemployment. Policy makers around the world have raising concerns about this issue and strive to define a health system that alleviates the shortage while taking into consideration medical education as the supply mechanism of physicians. There is a prevalent need for alternative policies. Bourgain, Pieretti, and Zouand (2008) consider that substitution policies are strategies sometimes chosen for curtailing the shortage of health professionals especially caused by the outflow of medical personnel.

In this regard, the EU is suggesting the new policy approach of "chosen migration". As the EU is experiencing a clear economic need for high skilled immigrants, its members are embracing policies to promote job dependent migration (Kahanec & Zimmermann, 2011). In other words, EU members are

allowing labor market to select immigrants according to its needs.

Those authors argue that the selection is based on skills or education while giving preferences to immigrants with university degree or professional qualifications. On the other hand, those policy projects are still in their infancy phase. In fact, there is still ambiguity about immigration policies and how they are handled between the different member states. There is a lack of an effective and generalized immigration policy that allows for the alleviation of shortages and the mismatches between supply and demand of migrants. Therefore, in the case of medical doctors and taking into consideration the fact that shortages and migration seem to be irreversible facts; policymakers have to define an economic model that will allow for a win-win situation between the parties involved. The model has to capture the different incentives at all levels and get to a kind of balance between developed countries willing to overcome shortages and developing countries seeking human development.

#### ***6. Mobility in relation to the brain drain and brain gain debate***

Brain drain in relation to emigration of already trained skilled labor or as potential candidate to be trained abroad with possibilities of not returning to the home country after graduation, has been considered for a long time as a major source of losses to the economy of origin. Major debates have been taking place on this issue and its related impacts. Most of the discussions that have been developed at the level of countries and at the level of regional and international organizations have been considering the emigration of skilled labor as a major engine for human capital flights in relation to the number of skilled emigrants leaving or not returning to their countries of origin. These discussions recognize the importance of skilled labor for an economy besides recognizing the negative impacts of their departure and non return. They also underline the likely massive flows of departures and non return, but later on the stocks of skills that are away from the economy of origin. While the emigration flows might be considered as having limited effects, countries may start wondering under massive accumulations of skilled labor abroad.

Different publications, such that of George (2006), refer to the historical background of skilled migration. This author emphasizes the role of political unrests, wars and natural hazards besides policies that have also contributed to forced brain drain to other countries that offer more favourable conditions of life. This author cites the movements developed in 1930s, 1940s and even recently in some countries. He also refers to major destinations such as USA and UK. Different books and reports besides a large set of papers have been produced to underline the negative effects of brain drain.

Dugger (2005) considers that 'Brain drain' is damaging the poorest countries in Africa, Central America and the Caribbean. These are losing sometimes high portions of their college-educated workers to wealthy economies as shown in a World Bank study (World Bank, 2005). The findings are based on an extensive survey of census and other data from the 30 countries in the Organization for Economic Cooperation and Development, which includes most of the world's richest countries. In contrast, less than 5 percent of the skilled nationals of the developing world, like India, China, Indonesia and Brazil, live abroad in an OECD country. These patterns suggest that an extensive flight of educated people is negatively affecting poorer countries, with the largest developing countries better able to have relatively smaller losses of talents. They can even benefit from them when they return or invest in their countries of origin.

The book by Adams (2003), entitled "International Migration, Remittances & the Brain Drain," found that from a quarter to almost half of the college-educated nationals of poor countries like Ghana, Mozambique, Kenya, Uganda and El Salvador live abroad in an OECD country - a fraction that rises to more than 80 percent for Haiti and Jamaica.

Another book by Schiff and Ozden (2005) looked at different aspects of international migration with its enormous economic, social and cultural implications in both origin and destination countries. This book examines also the determinants of migration, the impact of remittances and migration on poverty, welfare, and investment decisions, and the consequences of brain drain, brain gain, and brain waste.

Jun (2010), in his article about attracting talent from abroad, considers that these are the fiercest of times in the competition for talent. China has issued a Medium and Long terms Talent Development Plan (2010-2020) in response to the rapid economic growth and the large needs for skilled labor. The number of Chinese returning from overseas has been growing in relations to the series of incentives provided. The author insists also on the great changes that have taken place in the global economic. The high competition among countries and that has shifted toward emerging strategic industries and a talented person is recognized by the author as the main driver for the new Chinese policies.

### ***7. Mobility of medical doctors and brain drain in healthcare***

Torres and Wittchen (2010) consider that healthcare is generally under-provided in developing economies and its accessibility also tends to be biased towards urban and relatively privileged patients. Several authors have been addressing the issues related to the deficits of medical doctors in developing economies.

Chen and Boufford (2005) insist on the detrimental nature of the movement of physicians from poor to rich countries. To the authors, the existing statistics do clearly address the extent of this problem for series of countries. They refer to Mullan (2005) who emphasizes that 25 percent of U.S. physicians are international medical graduates, with higher figures for the United Kingdom, Canada, and Australia.

Apart from the economic losses (investment in education of doctors and nurses, their service and tax collection from their incomes), Kirigia, Gbary, Muthuri, Nyoni and Seddoh (2006) identified other losses of a social and moral nature. This loss of role models and guardians of human rights occurs particularly in rural areas.

Hooper (2008) refers to the reports by the United Nations and the World Health Organization to emphasize that the brain drain of healthcare professionals from the developing to the developed world is decimating the provision of healthcare in poor countries. The migration of these key workers is driven by a combination of economic conditions and the policies pursued in the rich world. The author assesses the impact of the healthcare brain drain and argues that wealthy countries have a moral obligation to reduce the flow of healthcare workers from the developing to the developed world.

Mills, Schabas, Volmink, Walker, Ford, Katabira, Anema, Joffresg, Cahn, and Montaner (2008) introduce statistics showing the shortages of healthcare staff in sub-Saharan Africa. They find on average that one physician serves 8,000 people. According to Clemens (2009), the level of medical care provided by doctors in Africa depends on a vast array of factors.

Other publications have looked at the links between development issues and migration of medical doctors. Moullan (2009) analyses the impact of foreign health aid on the emigration rates of physicians using a panel data to investigate the emigration of physicians from 192 source countries to 17 destination countries between 1995 and 2004. Bhargava, Docquier and Moullan (2011) analyze the effects of physician emigration on human development indicators in developing countries for the period 1991-2004. They find that reducing medical brain drain may likely only induce small benefits for child mortality and vaccination rates as they are other variables that affect the attainment of the Millennium Development Goals. But a large number of publications insist that medicine has a strong tradition of international collaboration, with high mobility of medical doctors moving around the globe to gain further training and different clinical experiences. Some authors such as Johnson (2005) said that "We gain in the North, but developing countries lose out by losing their doctors permanently" (Johnson, 2005). Murdoch (2008) has discussed the issue for Poland.

## 8. Conclusion

The above survey of literature shows that the needs for medical doctors have been increasing through time and countries under the effects of the changes occurring in health technologies and the increasing demand for health care. The implied shortages have been growing while accounting for new niches related to the expression of the demand for health and improvements in the welfare of the populations. The shortage of medical doctors could be also related to the nature of the labor supply curve that may not respond positively to new incentives. These needs and processes have been leading to the acceleration of the migration of physicians to economies where higher expected benefits and better working conditions. Developing countries appear to be mainly sources of this migration but developed economies have been also concerned.

The overall picture that has been developed by different researchers is that brain-drain is the consequence of the on-going trend of migration. This has had implications on both international and national debates and policies. Series of contributions in different disciplines related to social sciences have been developed around this approach.

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