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The Brain Drain. A Survey of the Literature

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Abstract

This paper reviews the theoretical and empirical literature on Brain Drain (BD). We propose an ideal path that links the first studies with the most recent ones. In this development, the literature on BD focuses on a variety of economic and social issues and recalls to national and international debates.

This paper uses more than 350 articles from a variety of sources. The sources are specialized professional journals, internet research engines, governmental publications and newspapers.

In the first part we analyse briefly the BD, its different definitions and the historical roots of the BD. This part shows that the BD is a wide and complex phenomenon.

In the second part, we propose an ideal path to interpret the literature. This part analyses how BD is linked to political and social events, according to the Economy.

Keywords: Brain Drain, International Migration, Human Capital, Growth, Economic Methodology and History of Economic Thought

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Introduction

This survey reviews the theoretical and empirical literature on the Brain Drain (BD hereafter). We propose an ideal path that links the first studies (in the 1950s) with the most recent ones. In this development, the BD's literature focuses on different economic and social topics: International Migration, Human Capital, Population, International Commerce, Growth, Low Developing Countries, etc. Furthermore, these BD's studies recall often to national and international debates: the role of the International Institutions and Organizations, the illegal migrations, the Human Rights, the Ethnical discriminations, the different USA's migration policies, the post war problems, the illegal migration from Mexico to the USA, the specific Tax Reforms in USA, the Gorbachev's Age, the collapse of the Soviet block, the Chinese policies, etc.

To write this survey, we used a specific methodology. At first, by using internet research's engines as "Jstor", "ScienceDirect" and "EconLit" we identify a large number of articles that analyse the BD. Subsequently, we integrate these sources with others papers from the references and the quotations contained in the former articles. Using this method, we obtained about 350 articles which treat the BD's phenomenon. Through the complete list of articles would be endless, this review can be used as a systematic study to analyse the theoretical evolutions of the BD from the 1950s to the recent years.

The paper is organized as follows. First, we analyse the different definitions and the historical roots of the BD. This part shows that the BD is a wide and complex phenomenon. Second, we propose an ideal path to interpret the literature. This part analyses how BD is linked to political and social events, according to the Economy.

1 The Brain Drain

The term "Brain Drain" is used as a synonymous of the movement of human capital, where the net flow of expertise is heavily in one direction (Salt 1997). Use of the word 'Brain' pertains to any skill, competency or attribute that is a potential asset. Use of the word 'Drain' implies that this rate of exit is at a greater level than 'normal' or than what might be desired. Linking the two implies that the departure of the most talented at an appreciable rate (Bushnell and Choy 2001). The British Royal Society first coined the expression to describe the outflow of scientists and technologists to the United States and Canada in the 1950s and early 1960s. During the following decades BD was characterized as a North-South, developing-developed country issue (Carrington and Detragiache 1999). In general, the Neoclassical literature agrees that positive technological externalities of immigration arise because of the additional capital that is available to the hosting economy. The theoretical argument goes back to the development of the literature of 50's (Hirschman, Myrdal, Perroux, Wallerstein). These authors enjoyed a revival in the mid-1980's with the birth of the so called New Growth Theory. Starting with several papers by Paul Romer (1986, 1987, 1990) and Robert Lucas (1988), the immigration of skilled migrants has been regarded as stimulating for the dynamics of economic growth. The possibility that the welfare of those remaining in the LDCs could be reduced by an outflow of educated manpower had been recognized in the literature as well. Work by Grubel & Scott, Berry & Soligo and Harry Johnson in the 1960s, concludes that welfare of non-migrants would fall only if the migrants' contribution to national output were greater than their income (or consumption in a static model). For several reasons, the literature believes that the conditions for a BD to be welfare-deteriorating are often verified. Starting from this last considerations, Bhagwati proposed a "Brain Drain Tax". This tax should, from one side, reduce the "free riding" linked to the BD and, from the other side, it should be a kind of "monetary compensation" that the Development countries pay to the LDCs for the "draining of their cultural

and scientific elites". Around the Bhagwati's proposal we find an interesting debate in the papers of Bhagwati & Dellafar (1973), Bhagwati (1975, 1976a, 1976b) and Hamada (1977).

In the 1960s and 1970s debates concluded that BD was conditioned by political and economic imbalances in the world system (Portes 1976; Lidgard and Gilson 2001). Furthermore, several studies analyse the role of the International Institutions and Organizations, the coordination of the social and migration policies, the legitimacy of restrictive migration policies (in relation to the human rights' declaration), etc.

Finally, in the 1990s, some authors begin to analyse the circumstances where the Brain Drain becomes 'Brain Gain'. Several theoretical papers examine the impact of migration prospects on human capital formation within a context of uncertainty. The rationale is roughly the following: in a poor economy with an inadequate growth potential, the return of human capital is likely to be low and this would lead to a limited incentive to acquire education, which is the engine of growth. However, the world at large does value education at hence, allowing migration to take place from this economy would increase the educated fraction of its population. Given that only a proportion of the educated residents would emigrate, it could well be that *in fine*, the average level of education of the remaining population would increase (Beine et alia 2001). The Brain Gain is analysed in several papers: i.e. in models when labour is heterogeneous and when only the most skilled residents emigrate (Mountford 1997, Docquier & Rapoport 1997), in models with homogenous labour (Stark et alia 1998, Vidal 1998) and in models with imperfect information and return migrations (Stark et alia 1997).

Different definitions of the Brain Drain

Several definitions of BD are given in the English's dictionaries, on the contrary, in the majority of economics' dictionaries this voice is not considered or, more often, it refers to the definitions of International Migration and Human Capital. The absence of the BD's definition in several edition of an authoritative dictionary like *The New Palgrave* is significant.

The definitions reported below show that, initially, the authors remark the social, ethical and political aspects more than the economical ones.

(1981)

Brain Drain: The migration of educated and skilled labour from poorer to richer countries. Education skill, which represents investment in human capital, is usually cheaper to acquire in poorer, labour-abundant countries, since its provision is usually a labour intensive activity. Those with the skills or education then move to more developed countries where the return to their human capital is higher. Such migration is often encouraged by laws and institutional factors, as most countries look more favourably on immigration by those with skills than those without¹.

(1982)

The Brain Drain is an expression of British origin commonly used to describe one of the most sensitive areas in the transfer of technology. It refers to skilled professionals who leave their native lands in order to seek more promising opportunities elsewhere².

(1992)

Brain Drain "International migration of highly qualified persons, e.g. surgeons, physicians, scientists and engineers, from low income countries to more prosperous economies, especially the USA. Differences in salaries and research facilities, together with the over-supply of specialized graduates in less developed countries, has brought about this increase in the human capital stock of advanced countries. See also immigration, migration³.

(1997)

Brain Drain: a pejorative description of the tendency for talent people from poor countries to seek employment in richer ones. Sometimes this migration occurs because, while similar skills are needed in both poor and rich countries, the rich pay more for them. In other cases brain drain occurs because

¹ The Dictionary of Modern Economics, edited by D. W. Pearce . (1981) The Macmillan press, London.

² Kwok & Leland (1982).

³ Donald Rutherford (1992) Dictionary of Economics, edited by Routledge, London.

the technical and economic backwardness of poorer countries means that job opportunities there are limited or non-existent. It is also possible that brain drain is encouraged because of tendencies in poorer countries to fill such good jobs as there are on a basis of family connections, political influence, and corruption, while on average richer countries, though subject to some of the same problems, tend to fill posts on a slightly more meritocratic basis⁴.

However, the language around the BD has been altering. In the OECD Report (1987) there are two BD's definitions: **Brain exchange** and **Brain Drain waste**.

“Brain exchange implies a two-way flow of expertise between a sending country and a receiving country. Yet, where the net flow is heavily biased in one direction, the terms "brain gain" or "brain drain" is used. A further term, 'brain waste', describes the waste of skills that occurs when highly skilled workers migrate into forms of employment not requiring the application of the skills and experience applied in the former job”.

Furthermore, in Johnson & Regets (1998), the authors introduce a new BD's specification: the **Brain Circulation**.

“This refers to the cycle of moving abroad to study, then taking a job abroad, and later returning home to take advantage of a good opportunity. The authors believe this form of migration will increase in the future, especially if economic disparities between countries continue to diminish. Such circular migration has been observed amongst Malaysians who had studied in Australia, for example”.

Moreover, **Brain Return** is an inherent part of the BD debate. In a significant study of Brain Return, Glaser (1978) shows that the commitment to return to the home country is very strong amongst high-level personnel working or studying abroad. Whilst many stays away longer than they initially planned, they eventually return to their home country. Finally, there is the **Brain Gain** exposed in the previous paragraph and the **Black Brain Drain** that we analyse in the next one.

The Brain Drain “ante litteram”

Although the BD appears in the 1950's, it is possible to identify in previous studies some anticipations to the BD themes. For example, in the following passage is evident that also in the Mercantilist Age, BD's policies were adopted by Governments.

“Privilege granted to Mr. Guichard for the Cotton-Waste's Manufacture of Saint Quentin”⁵

Pierre Guichard, merchant of our city of Saint Quentin, having opened in our above quoted city a factory of Cotton-Waste and of other articles of cotton and thread, he has done humbly observe that, not having been created ever in our Kingdom a factory of this type, he has been forced to support strong costs for attract workers from foreign Countries. [...] for attract many workers in the aforesaid manufacture, we want that the aforesaid workers foreigners that will have worked for six complete and consecutive years in the said manufacture are advised citizens of the Kingdom and naturalized French [...] and in the case in which they during these six years come to die, we want that their widows and their heirs enter in possession of the goods that they will have acquired or that they received in this Kingdom [...].

(Versailles, February 1671)

Furthermore, Richard Cantillon in the « Essai Sur la Nature du Commerce en General », shows that it is well known the importance of the migration of high skilled workers and their education like part of the wealth of a Nation.

⁴ John Black A dictionary of Economics, oxford NY 1997

⁵ In P. Deyon, Il Mercantilismo, Mursia, Milano 1971. The translation is mine.

Si le Roi de France envoie cent mille Sujets à ses frais en Hollande, pour y apprendre la Marine, ils seroient inutiles à leur retour si on n'envoie pas plus de Vaisseaux en Mer qu'auparavant. Il est vrai qu'il seroit d'un grand avantage dans un État de faire apprendre aux Sujets, à faire les Manufactures qu'on a coutume de tirer de l'Etranger, & tous les autres ouvrages qu'on y achete; mais je ne considere à-présent qu'un État par rapport à lui-même⁶.

The BD is strictly linked to the concept of Human Capital (HC hereafter). For this reason, if we would identify the historical roots of the concept of BD, we can not avoid to analyse the historical roots of the concept of HC. For a detailed analysis of the HC we remand to Kikler (1966). He writes:

[...] the concept of human capital was somewhat prominent in economic thinking until Marshall discarded the notion as “unrealistic”. Economists who considered human beings or their skills as capital include such well-know names in the history of economic thought as Petty, Smith, Say, Senior, List, von Thünen, Roscher, Bagehot, Ernst Engel, Sidgwick, Walras and Fisher. [...]

In the same work of Kikler, there are underlined the contributions of the authors above-mentioned.

One of the first attempts to estimate the money value of a human being was made around 1961 by Sir William Petty. Labour to him was the “father of wealth”. It must therefore be included in any estimate of national wealth. He used the notion of human capital in attempts to demonstrate the power of England, the economic effects of migrations, the money value of human life destroyed in war. (Hull, 1899, 589-95) [...] From time to time throughout the history of economic thought, economists have included human beings, or their acquired abilities and skills, as a component of capital. Although some of them attempted to estimate the value of this capital – on both microeconomic and macroeconomic levels – and to employ these estimates for a specific purpose (for example, to estimate the total economic losses resulting from war) , others have merely included human beings or their acquired abilities and skills, in their definition of capital and recognized the importance of investment in human capital as a means of increasing the productivity. [...] Although he did not specifically define the term “capital”, Adam Smith included in his category of fixed capital the skills and useful abilities of human beings. The skill of a man, he said may be regarded as a machine that has a genuine cost and returns a profit”. (Smith, 1937, pp 101, 259-66). Jean Baptiste Say (1821, pp 92-94) asserted likewise that since skills and abilities are acquired at a cost and tend to increase worker productivity they should be regarded as capital. This was also the contention of John Stuart Mill (1909, p 47) and William Roscher (1878 p.151) and at the microeconomic level, Henry Sidgwick (1901, pp. 132-34.). [...] To Friedrich List, skills and acquired abilities of human beings [...] were the most important components of a nation’s stock of capital. He asserted that, in both production and distribution, the contribution of this human capital to output must be considered (List ,1928, pp. 108-18). [...] Léon Walras who included all human being in the concept of capital and the value, or price, of these human beings, he said, is determined like that of any other capital good. (Walras 1954 pp. 40, 214-216, 271). [...] Although Alfred Marshall admitted that an estimate of the capital value of a man might be useful and discussed clearly the capitalized-net-earnings approach to human capital evaluation. He disregarded the notion as “unrealistic”, since human beings are not marketable (Marshall, 1959, pp. 469-70, 705-6). Human beings are included in Irving Fisher’s definition of capital. Capital, he asserted, is a “useful appropriated material object”, and since human beings have these characteristics. [Fischer (1897) pp. 201-202; (1927) pp 5, 51-52, 68]

⁶ *If the King of France sent 100,000 of his subjects at his expense into Holland to learn seafaring, they would be of no use on their return if no more vessels were sent to sea than before. It is true that it would be a great advantage to a state to teach its subjects to produce the manufactures which are customarily drawn from abroad, and all the other articles bought there, but I am considering only at present a state in relation to itself.* Richard Cantillon, *Essai sur la nature du commerce en general*, 1755, chapter IX, First part.

2 The Brain Drain in the scientific articles, a quantitative and qualitative analysis

2.1 Brain Drain in USA

After the Second World War (WWII hereafter), the principal beneficiary of migration flows were the United States of America. Consequently, there are several papers that analyse the consequences of the BD in USA. These studies examine the strong social changes in the US due to the constant flow of emigrates, the new composition of the North-American's population and the contribution given by the cultural elites of the Western Countries. It is significant to note that these themes are discussed not only in scientific debates but also in political and legislative ones. For example, there are studies on the consequences of the American migration's policies on the American society, there are papers that analyse how the federal financing influences the migration of American students and there are studies on the BD of black students and professors which move from their University to the white's ones (phenomenon called "Black Brain Drain"). In the following paragraphs we analyse deeply all these topics. In the chart 1 and 2 (see appendix) are illustrated the number of the papers that study these topics.

Social and economical effects of the Brain Drain in USA

In the 1960s sociologists, economists and politicians begin simultaneously to analyse the BD in the US. For example, there are the important works of Grubel & Scott (1966a, 1966b, 1967 and 1976) that analyse the international migration in the US and the BD phenomenon. These works start an animated debate among economists⁷. The debate is not limited to the US but also analyse the BD in Canada. During the same period, several authors analyse the consequences of massive migration in the American Society and the impact of the BD on the Sciences and Research in the USA⁸. These studies are part of a wide and international debate which proposes to reform the Sciences and the Research by an international coordination of Universities, Governments, International Organizations and Foundations. The conference sponsored by the Council on International Affairs and Cultural (Washington, 1966) is a result of these debates. The subject of this conference was: *The international Migration of talent and Skills*. Furthermore, in the 1968, the American Congress constitutes a committee and a subcommittee with the aim to study the BD from the developing countries⁹. In the 1970s, there are not many studies on these topics. Differently, in the 1980s some authors begin to analyse newly the BD in USA¹⁰.

Consequences of American policies on the BD

The contributions of the previous section, analyse the effect of a massive migration in the USA. Another stream of research analyses how American policies influence migration. For instance, there are the works of Mushkin (1962), Friedman (1973) and Keely (1971). In particular, Keely analyses the effects of the Immigration Act of the 1965 on the demographic characteristics of the USA. Differently, Friedman analyses the effect of this Act on the flow of skilled migrants from LDCs.

⁷ For example, we have comments by Aitken (1968) to Grubel and Scott articles of 1966 and 1967, and their reply to these comments in Grubel and Scott (1968).

⁸ Sims (1966,1970), Ladinsky (1967) [he refers to "migration of elites"], Dale (1968), Porter (1968), Ritterband (1970), Fortney (1970) and Whelan (1974) [he analyse the scientific mobility correlated to the BD].

⁹ USA Congress, Committee on government operations, scientific Brain Drain from the developing countries (1968) and USA Congress, Subcommittee: the BD of scientists, engineers and Physicians from the developing countries into the United States (1968). In relation to this committees, there is the study of Library of Congress (1974) entitled: "*Brain Drain: A study of the persistent issue of international scientific mobility*" elaborated for the sub Committee on National Security Policy and Scientific Developments of the Committee on Foreign Affairs, US house of representatives.

¹⁰ There are the papers of Greenwood (1983) [consequences of massive migration to the poorest and richest countries], Greenwood & McDowell (1986) [consequences of massive migration to the factors' market in USA], Chiswick (1986a, 1986b), Borjas (1987) [how the increase of personal income available for the migrants is the principal motivation to migrate to the USA], Huang (1988) [an empirical analysis of foreign student BD to the USA] and Kossoudji (1989) [how in USA the migrants are assimilated in the Work's market].

Analogues studies are in the papers of Keely (1975), Bellante (1978), Brandt & McNamara (1980) [The Brandt Commission] and Fogel (1980). Specifically, Fogel reports the principal themes discussed in a Symposium on “United States Immigration Issues” and he analyses the impact of the new American migration’s policies on the BD. In 1986, these debates result in the Immigration Reform and Control Act, which analyses the new problems caused by the massive migration in the USA. Finally, Reynolds & McCleery (1988) study the role of these policies on the American and Mexican migration and Agarwal & Yochum (1987) analyse the effect of the Eilberg Act on the immigration. All these studies link BD to the contemporaneous events and to the international debates. For example there are studies on the illegal immigrations, on the BD in the Medical Sector, on the BD and Taxation, on the sexual discriminations and studies that refer to specific historical events¹¹.

Brain Drain inside the USA and Black Brain Drain

The BD is also analysed as an internal and specific problem of the USA. For example, there are some studies that analyse the BD caused by the presence of different levels of taxes and subsidies in the American federal districts. Furthermore, considerable are the works of Murphy (1969) [he analyse the internal BD due to the different federal funds assigned to Research and Development] and the work of Palley (1976) [he analyses the costs and financing funds for the non-resident students]. In the 1990s, some authors resume these themes. Of relevance are the works of Ehrenberg (1992), which analyses the migration of the new Doctorates, and the paper of Arum (1996) which analyse the BD in relationship to private and public schools.

There are several works that analyses the so-called “Black Brain Drain” in the USA. This debate is present in each period analysed, due to the numerous meetings and conferences organized by the Journal of Negro Education. It deserves mention to: “The Higher Education of Negro Americans” at the Howard University and the “Black Brain Drain Columbia Forum” both in the 1967. The Black Brain Drain is also studied in several papers between the 1960s and 1970s. For example there are the works of Harding (1968), Henshel & Henshel (1969), Hartnett (1970), Mommsen (1973, 1974), Morris (1972)¹², Bachner (1973) and Lyons (1974). According to similar topics, there is the work of Bryce-Laporte (1972) which remarks the inequalities between white and non-white migrants of the second generations and the fact that these last ones are non sufficient integrated in the American society like the Western migrants. Finally, between the 1980s and the 1990s, the Black BD is studied in the papers of Miller (1981), Dookhan (1981), Elmore & Blackburn (1983), Pierre &

¹¹ Regard the illegal migration there are the papers of Agarwal & Winkler (1985), Wilfred (1986), Hill & Pearce (1990) [they analyse the incidence of the sanctions versus who employs illegal workers], Penalzoza (1994) [he studies the Mexican migrants and their integration in USA] and of Chau (2001) [he analyses the political reforms fixed to prevent the illegal migration]. Regard the Medical sector, there are the works of Last (1963, 1969) [both referred to the UK’s doctors], Jonas (1965), Gish & Goofrey (1979) [*A reappraisal of the Brain Drain. With special reference to the medical profession*], Mejia et alia (1979) [medical sectors and nurses], Mick (1987) and Hellerstein (1988) [he analyses the different influence between Public and Private Funds on the medical innovations]. Regard the Taxation, there are the work of Espenshade & Minarik (1987) [they study the demographic effect of the American Tax Reform of the 1986] and the work of Greenwood & McDowell (1991) [they analyse the differences between USA and Canada ad poles of attractions for the BD]. Regard the sexual discrimination, there are the works of Hochschild (1973), Mejia et alia (1979), Spivak (1981) [French Feminism], Benavot (1989) [migration linked to the gender], Pedraza (1991) [Women and Migration], Vega & Rumbaut (1991) [ethnic minorities and sexual discriminations] and Scott (1993) [he, analysing the Canada and his citizens, refers also to the specific characteristics of the female migration in Canada]. Regards the contemporary historical events, there are the works of Dittmer (1981) [the strategic triangle (USA, URSS and China)], of McDougall (1982) [Space’s Age], Portes & Stepick (1985) [Cubans and Haitians refugees in USA] and Mills (1986) [international mobility of Russian researchers and scientists in the Gorbachev’s Age]. In the 1990s, we furthermore find the works of Stavits (1990) [contradictions of the communist reform in China], Hooks (1990) [Pentagons and Defence’s Program], Ma (1993) [“exit and voice”; the returns in China of the exiles policy] and Oberschall (1996) [the passage from Socialism to Markets (China and Hunger)]. About this last argument, there are several papers focused on the countries of the former URSS. Let see the following chapters for furthermore details.

¹² Morris resumes perfectly the debate and the worry for the fact that many black professors and students migrate from black institutions to white ones thanks to better work’s time, wages and structures.

Adams (1987), Adams (1990) and Allen (1991). Allen, in particular, affirms the importance of analysing the effective Black Brain Drain in relations to twenty years of studies on this topics. Other authors follow the line of research inaugurated by Allen. There are the works of Weaver et alia (1992), Spear (1993) [He analyses the Multiculturalism in the American Universities], Ponder et alia (1994) [African-American Higher Education], Krieg & Wheelan (1995) [the paper, “A Nation Divided by Its Schools”, studies the fundamental problem of the funds for the public schools], there are several works that in the 1997 claim the return of the Black Brain Drain in consequence of the new California’s laws that are favourable to some minorities by sacrificing the black ones, and, finally, the work of Lundberg & Startz (1998) about the persistence of racial inequalities in USA.

2.2 Brain Drain in the rest of the world

In the 1970s there are several articles that analyse more generally the BD from the sending countries’ point of view. For example, there are the papers of Grubel & Scott (1966), Enke (1969) and Miracle & Berry (1970). These first works are focused on the BD from Western Countries. In particular the European ones. Furthermore, in the following years, there are several papers that analyse the BD phenomenon either in the LDCs. In the chart 3, 4 and 5 (in the appendix) are indicated the number of papers devoted to these topics.

Europe

The BD was debated in Europe since the 1960s. Several conferences and the meetings analyse the European migration¹³. About the BD in Europe, Beijer writes : “For a long time the flow of migrants from Europe to the New World was caused by political, racial, religious, and demographic pressure and differences. The migrants came from all social strata. In the nineteenth century and up to 1914, lords and beggars, adventures and underdogs, gold-diggers and bread-winners moved on a large scale from Europe to North America, Latin America, Oceania and South Africa. The challenge to present times is evident. The modern pattern shows a reversal of the flow: skilled labour and scientific personnel are moving from the less prosperous countries to the four richest nations of the world, and especially the United States”.

Several paper written in the 1970s analyse the BD in Europe¹⁴. Beijer writes : “In Europe the discussion has been encouraged by the report *Emigration of Scientist from the United Kingdom*, Royal Society (London 1963). This report is also a reaction to articles and letters in the popular press and the professionals journals, in which it was hypothesized that British scientists and technologists were being attracted to foreign countries (especially the USA) by greater professional and economic opportunities there”. Describing the others European States, the same author reports: “For Italy and the smaller European countries, the emigration of scientists is proportionately higher because, in most of these countries, the secondary schools teach English with the other languages and their mother tongue, and the universities an adequate knowledge of the English language is considered a matter of course”.

¹³ For example, there is the “European Population Conference” placed in the Council of Europe. This debate emerges also in the “Communication on movements of intellectuals” analysed in Edding & Badenhöfer (1966) and in the works of Rhoades (1977) and Beijer (1969). Rhoades analyses the intra-European migration inside the Mediterranean basin.

¹⁴ There are the works of Last (1963, 1969), Christoph (1964), Gerstl & Perrucci (1965), Wilson, James (1966), Pyatt (1968), Johnson (1968), Yates (1968), Uselding (1970), Balacs and Gordon (1975) and Partington (1975). In all these works there is a reference to the BD in UK. Furthermore, there is the article of Blazer (1967), in which is anticipated the relationship between Taxation and BD and the consequences of the BD on the financial resources of England, there is the work of Brogan (1968) which analyses the Research and the University in Europe, there is the work of Schultz (1968) on the Western Germany’s University, finally, there is the work of Bhagwati et alia (1984) [West German’s system of immigration].

In the 1980s there are few works that analyse the BD in Europe. These topics enjoy a revival in the 1990s. In particular, there are studies on the Irish migration, the unification of Germany and the BD received from Eastern Europe¹⁵.

Canada

In the 1960s, there are several works that analyse the BD in and from Canada¹⁶. As for the analyses on the BD in USA, also in this case the paper of Scott & Grubel starts an interesting debate. Furthermore, it is interesting to note that the BD was not always from Canada to the USA, but from other countries to Canada and, in some particular occasions as the Vietnam's war, the constant migratory flow from Canada to USA is compensated by an equivalent one from the USA. Either in the 1970s, the 1980s and in the 1990s there are several works devoted to study the BD in Canada¹⁷. For this reason, it is also possible to affirm that there exist authentic Canadian schools on these topics.

LDCs and others

Several are the papers that analyse the BD in the LDCs. There are papers that analyse the BD in the Central and South America¹⁸ and in Asia¹⁹. For what regards Africa, there are some recent contributions²⁰. Most of these developed in the 1990s and analyse the state of the University and of the Research in Africa. Also, there are several studies on the BD in URSS²¹ and in other countries²².

¹⁵ Regarding the Irish migration, there are the works of O'Rourke (1992), which analyses the motivation for the Irish emigrants to migrate, and O'Hearn (1994) which analyses the Irish industrial history. Regarding the unification of Germany, there are the works of Rhode (1991) which analyses the BD from Eastern Europe to Western Europe, of Jurgens, Klinzing & Turner (1993) [BD from Eastern Germany to Western Germany] and other articles related to the ex URSS. Regarding Eastern Europe, there are the papers of Wolburg (1996, 1997), Wolburg & Wolter (1997) [BD inside the EU], Salt et alia (1999), Bauer & Zimmermann (1999), Straubhaar & Wolburg (1999), Dauderstadt, (2001) and Salt (2001).

¹⁶ In the 1960s there are the works of Johnson (1965a, 1965b, 1965c), Triantis (1965), Musgrave (1968) [He analyses the "Carter report" and the influences of the taxation on the BD], Scott & Grubel (1969) and Trueman (1969).

¹⁷ In the 1970s there are the works of Comay (1970), Holmes (1974), Devoretz & Maki (1975, 1983), Boyd (1976) and the book of Grubel & Scott (1977) entitled "The Brain Drain". In the 1980s, there are the works of Boadway & Flatters (1982) [taxation and Canadian BD], of Markusen (1988) and of Kesselman (1988). Finally, in the 1990s there is the work of Greenwood & McDowell (1991) which analyses the difference between USA and Canada like "BD attraction's poles". Furthermore there are the works of Lipset (1993), Scott (1993), Akbar & Devoretz (1993) and Helliwell (1999).

¹⁸ There are the papers of Loomba, Turban & Cohen (1968), Hall (1973) [He compares the population's growth in USA and in Latin America] and Ayres (1975) concerning the Latin America in general. There is the paper of Oteiza (1965), dedicated to Argentina. There is the work of Sahota (1968) which analyses the BD internal Brazil. Furthermore, several studies analyse the consequences of massive migrations from Mexico to USA. There are the works of Beijer (1966), Reynolds & McCleery (1988), Wenez & Ronfeldt (1991) and Penalzoza (1994). There is the work of Funkhouser (1982) [Nicaragua]. Finally, Portes & Stepick (1985) study the Haitian and Cuban refugees in USA.

¹⁹ There are the works of Kroef (1968) and Baldwin (1970) which refer to the Asia in general. Other works analyse in depth the Pakistan: Wilcox (1968) [internal BD] and Liesch (1968) [the University in Pakistan]. There is work of Turkcan (1974) that regards the Turkey. There is the work of Goldfarb et alia (1984) regarding the Philippines. There is the paper of Malek (1981) that analyses the Iran case. Several studies regarding Taiwan: Appleton (1970), Ho (1975) and, more recently, Wei-cheng Wang (1995) [he analyses if, in Taiwan, there is BD or Brain Gain thanks to the positive externalities due to the international migration from Taiwan to other countries]. Regarding Singapore there are the works of Quah (1989) [BD and medical sector in Singapore] and Beng (1990). Concerning the political and migration consequences due to the return of Hong Kong to China, we find the works of Cheng (1990) and Skeldon (1990). Several works analyse the BD in India: Cassen (1976), Vicziany (1982), [Indian population] Lakshmi and Bean (1976) [Indian University], Weiner (1982) [Indian migrations on the Persian Gulf], Madhavan (1985), Lewis (1991) [the Research in India], Radhakrishnan (1993) and MacNeil (1993). About China there are only recent works: Bakken (1988), Hayhoe (1988) [Reform of the Chinese University], Ma (1993) ["exit and voice" and return of the exiles' policies in China] and Zhidian (1992) [BD in China]. Finally, the Sri Lanka's University is studied by Matthews (1995) and the BD in Japan is studied in the works of Dore (1972) [Japan and the importance of the tradition on the Education policies] and Rostow (1985) [Japanese or American commercial leadership for the Pacific Zone].

²⁰ We find the works of McCain (1979, 1980) [Ghana], Udofia (1984) [the multinationals in Africa], Wood (1989) [apartheid in South Africa and BD quotes like one of the social consequences], Shermann (1990) [Research and Universities in the "modern Africa"], Nhundu (1992) (Zimbabwe), Ehie & Smith (1994) [Technological Research in

2.3 International Organizations, Population and Research

After the WWII, the role of the international organizations increases and several scientists and politicians try to find a common language and new international relationships. In this scenario, there are several studies about the role of the International Organizations to limit the negative externalities caused by massive migrations and the consequent BD. Furthermore, other studies analyse the consequences of big migratory flows on the population. Finally, recognising the importance of the Education and the Research in a national and international environment, the authors analyse how to coordinate the international research, how to limit the BD phenomenon, and how to reform the Universities and the Research's structures considered obsolete and inadequate. Chart 6 and 7 (in the appendix) shows the number of papers that study these topics.

The International Institutions

In the 1960s and in the 1970s there are many works that analyse how the International Organizations must manage the economical and social consequences of international migrations. Some authors analyse the links between civil rights and freedom to migrate, the links between the Labour and the International Relationship, the future international collaborations and their role to influence the growth's rate of a Nation and the relation North-South of the World²³. In the 1980s, also in reference to the Universal Declaration of Human Right, these topics are newly analysed²⁴. Moreover, In the 1991 we find an analysis done for the ONU about the Social Situation in Africa. In this analysis, there is also some mentions to the BD's question. In the "Recommendations" deliberated in the International Conference on Population of the 1984 there are references to the BD's problem.

International migration

(a) General guidelines for formulating international migration policies

Recommendation 46

In formulating policies on international migration, Governments of receiving countries should take into account not only their own country's economic and social needs but also the well-being of the migrants concerned and their families and the demographic implications of migration. Governments of countries of origin concerned with the continuing outflow of skilled workers and professionals should seek to

Nigeria], Laitin D. (1994) [University in Ghana] Hoffman (1995) [concerning the destruction of the Sub Sahara's Research], Zack-Williams (1997) [African Diaspora in UK], Abrokwa (1999) [Strategies for the Development of the Africa; role of the USA and of the Europe].

²¹ Regarding the ex URSS, we find the works of Mills (1986) [he studies the different international mobility for the scientists in the Gorbachev's Age.], Hogan (1991), Svejnar (1991) [both refer to the economic Reforms in the Nations of the ex URSS], Coleman (1993) [about the different demographic characteristic of Eastern Europe, Western Europe and ex URSS] and Oberschall (1996) [he analyse the passage from Socialism to Markets for the China and Unger].

²² There are the work of Ritterband (1969) [on Israel], the work of Suleiman (1973), which analyses the changes on the society due to the BD of Arabs in Palestine and Israel, and the work of Palfreeman (1974) which remarks, in relations to the Australia, the differences between the white migrants and the non-white ones.

²³ Regard the role of the International Organizations, there are the works of Cox (1968,1979), Revell (1968), Sherman (1968), Bell (1971), Keohane & Nye (1974), Pastor (1974) and Meron (1976). They refer essentially to the UNESCO, ILO (*International Labour Organization*), IAEA (*international Atomic Energy Agency*) and to the ONU. Bell analyses, instead, the international role of the Ford Foundation. Regard the civil rights, there are the papers of Nett (1971) and of Field (1971). Afterward, we find the works of Hirschman & Nelson (1976) and of Hirschman (1978) which analyse the BD by using the "exit and voice" methodology. Regard the Labour and the International Relationship, there are the works of Cox (1971) and Nye & Keohane (1971). Regard the Growth, there are the works of De Seynes (1972), Ruggie, Sathyamurthy (1973) and "The Cocoyoc Declaration" of 1975. Regard the relation North-South of the World, there is the work of Diaz-Alejandro (1975).

²⁴ There are, for example, Streeten (1980) [Basic needs and human rights], Weston (1981) [He refers explicitly to the Universal Declaration of Human Right], Whelan (1981) [He refers to the themes of Citizenship and Right to migrate], Hantke (1983) [He analyses the Discrimination and the protection of the minorities], Nafziger (1983) [He analyses the role of the international laws on influence the migration's flows], Hannun (1987) [He refers to the "Strasbourg Declaration on the Right to leave and Return" of the 1986] and Said (1991) [He analyses themes like Identity and migration's Freedom].

retain those workers as well as encourage their return through, inter alia, the promotion of an economic favourable to their expansion of employment opportunities. To redress the existing imbalance of skills, Governments should try to identify alternative skills resources. Government should formulate national and international measures to avoid the brain drain from developing countries and to obviate its adverse effects. Governments are invited to conduct, inter alia, consultations or negotiations, on either bilateral or multilateral basis, with the support, upon request, of competent international organization.

In the 1995 Vagts analyses the proposal of an “expatriation tax” and the eventuality that this tax can violate Human Rights. The suggestions to introduce compensations for the negative externalities of the BD are numerous and often refer directly to the Bhagwati’s proposal.

Finally, in the 1980s and 1990s, some authors analyse the delicate problem of illegal migration. For example, we have the papers of Lundahl (1985), Wilfred (1986) and Hill & Pearce (1990). In these works emerges the exigency of an international coordination to avoid this problem. In the next decade, we also find the work of Chau (2001) on the immigration’s policies reform and on illegal immigration.

Population and BD

Several articles analyse the consequences of a free migration on the population. For example, there are studies and the meeting that analyse the “Family program”, the “World Population Plan of action” and others similar themes²⁵.

During the 1970s, there are the “European Population Conference” in Strasbourg (1972), the “Meeting of the population Association” (1972 and 1974), the “World Population Plan of action” (1974 and 1975) and the “Population in the World Employment Conference” in the 1976. All these meetings and conferences analyse the worldwide population and the changes due to migrations. Of relevance are also other two conferences: United Nations International Conference on Population, 3rd edition in Bucharest (1974) and the 4th edition in Mexico city (1984). As a result of these conferences were several studies on the consequences of a quick growth of the population and the so called “International Migration Guides”, which analyses the BD’s problems. These topics were also studied in the “Program of Action of the 1994 International Conference on Population and Development”.

International coordination of the Research and University

Analysing the role of the International institutions, some papers study the importance of a wide coordination of the Research and among Universities. The more is the consciousness of the important role of the Education as national and international resource, the more are the proposals to coordinate internationally the Research. In the 1960s, some authors note the backwardness of several scientific Research’s structures in HDCs and in LDCs and remark the necessity to stop the BD’s phenomenon. Other scientists also analyse the condition of Research in Western Europe and in Asia²⁶. In the 1970s the debate is enlarged to the role of the Institutions on the Education’s

²⁵ In the 1960s there are the articles of Edding & Bodenhofer (1966), the book of Brass (1969), entitled Population Growth and the Brain Drain and the work of Sauvy (1966). In the 1970s there are the works of Hall (1973) [he compares the population’s growth between USA and Latin America], Brass (1974), Watson (1975), Berelson (1975, 1976), Cassen (1976) [he refers to the India] and Kitagawa (1977). In the 1980s there are several studies focused on the links between population and migration (and so BD). For example, we find the works of Miro & Potter (1980) and the Population Brief of 1980 [Latin America]. Furthermore, there are the works of Hobcraft, Menken & Preston (1982), Vicziany (1982) [India], King (1983) [he studies the migration from the LDCs and its social consequences for these ones], Kuper (1983), Tabah (1984), McNicoll (1984) [he analyses the consequences of a quick population’s growth], Bernard (1986), Kearney (1986), Caldwell, Caldwell & Caldwell (1987), Wood (1989) [he, analysing the social aspects of the apartheid in South Africa, quotes the BD as one of these consequences] and Scheffel (1990).

²⁶ Regards the Research in the LDCs, there are the works of Warren (1968), Fores (1969) and Russet (1969). Regards the Western Europe, there are the papers of Brogan (1968) and Schultz (1968). This last one studies the Western Germany. Regards the Asia, There are the works of Liesch (1968) about the Pakistan, Dore (1972) about the Japan and the importance of the tradition on the Education, and of Lakshmi & Bean (1976) about the India.

policies²⁷. In the 1980s and 1990s this debate regard either general topics either specific contexts as the Research in Asia and in Africa²⁸. Furthermore, within the Institutions founded in these years, there is the UNITAR [United Nations Institute for training and research]. Finally, in the “Program of Action of the 1994 International Conference on Population and Development” it is possible identify some crucial points of the debates on these topics.

Chapters XI Population, Development and education

11.4 [...] Inadequacies in and discrepancies between the educational system and the production system can lead to unemployment and underemployment, a devaluing of qualifications and, in some cases the exodus of qualified people from rural to urban areas and to ‘Brain Drain’. It is therefore essential to promote harmonious development of educational system is and economic and social system conducive to sustainable development.

2.4 The Brain Drain in the Economics Models

In this section, analysing the different models used to study the BD, we recreate the ideal path that the BD’s authors crossed. First, scientists analyse the consequences of the BD on Welfare. Second, they recognized the crucial connection between Education and Technology and, hence, the importance of an analysis of Human Capital as a principal element of the National Account . Third, they studied the impact of the BD on the International Commerce and on the taxation . They also analysed the possibility to introduce compensating mechanisms as the Bhagwati’s tax. Fourth, they studied how the BD decrease the Wealth and the potential Growth of the LDCs. Fifth, some authors analysed the BD stressing the importance of individual’s characteristics on the migration’s decision. These studies are within a more broad attempt to micro-found the Economic models. Finally, during the 1990s, some authors begin to introduce the possibility of positive externalities due to the BD. This last branch of the literature is labelled Brain Gain. Charts 8 and 9 (in the appendix) shows rated the number of papers devoted to these topics.

Brain Drain and Welfare

First studies on the BD phenomenon analyse its consequences on the Welfare of the countries involved in this flow of people. Some authors compute the social costs due to the migration. These costs entered in the National Account as an important voice. Several scientists point out the necessity of accounting these social costs. For example, research by Schultz analyses the notion of “human capital”. Successively, at the end of 1960s, several articles analysed the consequences of BD on Welfare. In the 1970s there are several studies and during this period we have the important contributes of Bhagwati²⁹. Finally, in the ONU’s General Assembly of the 1976, the “Welfare effects of BD” is discussed.

²⁷ There are the works of Stone (1972) [on the social consequences of the education], Streeten (1974) [limit of development research], Simon & Pilarski (1979) [on the consequences of the population’s growth on the amount of education received] and Jordan (1976).

²⁸ We find the works of Tinto (1982) [students’ problems], Mills (1986) [changes on the mobility of the researchers in the Gorbacev’s Age], Hartnett (1987) [BD in the Arts and in the Sciences], Woodhall (1987) [financing student flows], Huntington (1988) [Reforms for the Political Science], Bird & Allen (1989), Geiger (1990) [research in University], Levin & Stephan (1991) [studies about the “productivity of the Research”], Ehrenberg (1992) [the flow of the new Doctorates] and Arum (1996) [private and public schools in USA]. Regard the Asia, there are the works of Bakken (1988) and of Hayhoe (1988).[both are about the reform of the University in China], the work of Lewis (1991) [India] and the work of Matthews (1995) [Sri Lanka]. Regard the Africa, there are the works of Shermann (1990) [the University in the “modern Africa”], Nhundu (1992) [Zimbabwe and educational policies] , Laitin (1994) [Ghana’ University], Ehie & Smith (1994) [Technological Research in Niger] and Hoffman (1995) [destruction of the research in the Africa Sub Saharan].

²⁹ There are the works of Schultz (1959) [*Investment in man: an economist’s view*] and Schultz (1960) [*Capital Formation by Education*], Sjaastad (1962), Weisbrad (1964) [positive externalities of the public Education], Bowman & Myers (1967), Bodenhofer (1967), Galtung (1967) [scientific colonialism], Berry & Soligo (1969) [they analyse the “Welfare aspects” of the international migration], Watanabe (1969) [he analyses the BD from LDCs to the Western

Brain Drain and Education

Recognized the crucial role of the BD on the Nations' Welfare, some researchers investigate the relationships between BD and Education. The Education is not only an important element of the Welfare but it is also a key factor of Innovation, Technology changes, development and Growth. In this context, the effects of the BD on Education affect the Development. In the 1960s, 1970s and 1980s there are several authors that analyse these topics³⁰.

Brain Drain and International Commerce

Many authors tested how the BD is a key element in the international commerce because of its influence on some crucial production's factors. These arguments were anticipated by the work of Blejer (1978). In the 1980s and 1990s, there are several articles devoted to these topics³¹. In particular, Rauch (1991) stresses the necessity to reconcile the themes of the Commerce with the ones of Migrations.

Brain Drain and taxation

Many authors analyse the connections between the BD and taxations. For example, the work by Blazer (1967) analyses the consequences of the BD on the English taxation, and the work of Musgrave (1968) links the taxation with the Canadian BD. These topics are studied by Bhagwati and by other authors that followed a similar approach of the subject³². Finally, it is important to remark the "Bellagio Conference on the Brain Drain and Income Taxation", in Italy from 15 to 19 February 1975, where the scientist discussed several of these arguments.

Brain Drain and Growth

In the 1970s, some authors analyse the connections between BD and development. One of the important result of these studies is that the BD from the LDCs can explain the development of these

Countries] and Johnson (1969a, 1969b) [he analyses how the Welfare of those remaining at home changes in presence of BD and, in the second work, the circulation of the human capital]. In the 1970s, there are the works of Baldwin (1970), Scott (1970) [he analyses the opportunity to apply the human-capital's approach to study the BD's phenomenon], Romans (1974), Rodriguez (1975) Usher (1977), Glaser (1978) and Gmelch (1980). Regard Bhagwati, there are several works: Bhagwati & Hamada (1974), Bhagwati et alia (1975), Bhagwati & Rodriguez (1975), Bhagwati & Wan (1979).

³⁰ In 1960s and 1970s there are the works of Bodenhofer (1967), Patinkin (1968), Johnson (1972) [he analyses the technological gap between Western Countries and LDCs ones], Thompson (1974), Streeten (1974) [he analyses the connection between Technology and Development inside BD's topics], Haas (1975) [he studies the necessity to coordinate the Technology in an International framework], Johnson (1975) and Rodriguez (1975). In the 1980s, there are the works of Reubens (1983) [he presents models of the international migration from LDCs to Western Countries], Blomqvist (1986) [he studies the economical returns of the Education and the consequences on the Welfare of the international migration], Kindleberg (1986) [he studies the economical returns of the Education and the consequences on the Welfare of the international migration], Wong (1986) [an economic analysis of the international migration], Djajic (1989) [he studies the economical consequences of quantitative and qualitative restrictions to the international migration], Bhagwati (1991) [connection between Education and Welfare], Glaz'ev & Malkov (1992), Wong & Kee Yip (1999) and Beine et alia (2001).

³¹ There are the works of Corden (1984) [he studies the contributes of H Johnson], Ethier (1985) [international trade and labour migration], Rostow (1985) [Japanese or American commercial leadership in the Pacific's Area], Rauch (1991), Gould (1994) [he analyses the immigrants' consumptions in theirs native countries and the consequences on the commerce] and Ishikawa (1996) [Scale's Economies of the productive factors and migration].

³² There are the works of Bhagwati & Dellafar, (1973) [BD and Income Taxation], Bhagwati & Patrington ed. (1976) [in which there is the proposal to introduce an international taxation to recompense the LDCs for the BD], Krugman & Bhagwati (1976) [in the book edited by Bhagwati and entitled: *The Brain Drain and Taxation*] and Bhagwati (1979) [links between BD, taxes and Ethics]. McCulloch & Yellen (1975) [taxes and BD] and the book of Hamada (1977) *Taxing the Brain Drain: a global point of view* The new international order, edited by Bhagwati. Successively, these topics are resumed in the works of Boadway & Flatters (1982) [how the taxation can influence the Canadian BD], Minarik (1987) [how the taxation can influence the Canadian BD], Kay (1990), Wilson (1992) [he studies the "optimal Income tax"], Chang (1995) [how the taxation increase the BD's phenomenon], Vagts (1995) [he studies the proposal of an "expatriation tax" and if this tax violates the Human Rights] and Bucovetsky (2003).

countries. In the 1980s and in the 1990s several studies analyse these topics³³. These works analyse the “long run” effects of the migration and of the Education’s policies. Human Capital is treated as a important productive factor which is subject to the economies of Scale: it is subject to “Learning by Doing” and to different levels of obsolescence. These topics are not only analysed in academic works but also in Institutional organizations. For example there is the “Conference on Trade and Development-migration of skilled workers” organized by the ONU.

Brain Drain and Income

Within a general Micro-foundation of the Economics, some BD models start to investigate the personal motivation to migrate. These studies remark the importance of Income as key factor in the decisions to migrate. In the 1990s, several studies that analyse the connections between migration and wages’ differentials, the “Optimal income taxation and international Personal mobility” and several others micro-economics themes linked BD to the motivations to migrate³⁴.

Brain Drain and Brand Gain

In the 1990s some authors analyse the circumstances that lead to positive externalities for the sending countries. These studies found that BD should be defined as Brain Gain³⁵.

2.5 Miscellaneous and Brain Drain’s Books

Some authors, in the contest of the world economic history, mentioned the BD’s phenomenon due to the different migratory flows. Other articles analyse the BD together with other themes: models of international productivity, models of the decisions’ analysis, changes in Age of Marriage in the UK, International Migration under Asymmetric Information, R&D and Corruption, etc³⁶.

³³ In the 1970s there are the works of Pavitt (1973), Robinson (1974), Epstein (1974), Greenwood (1975) [he anticipates the important role of the technological competition and its consequences on the development], Ayres (1975) [he analyses the Latin America], Mc Culloch & Yellen (1977) and Petersen (1978). In the 1980s Kwok & Leland (1982) introduce a new model of the BD. This work starts an important debate how evidence the papers of Katz & Stark (1984) and, in answer to these ones, the new works of Kwok & Leland (1984). Furthermore, there are the papers of Harberger & Wall (1984) [they studies the figure of H. Johnson, in his studies on the Development’s themes], Caves (1984), Corden (1984) [he analyses the contributes of H. Johnson on the International Commerce’s Theory] and Djajic (1985) [he studies the Human Capital and how it can influence the Growth of a county]. In the 1990s there are the works of Chen & Su (1995), Romer (1986) [Long run growth], Miyagiwa (1988) [Human capital and Economic Growth], Chiswick C. (1989) [consequences of the migration of Human Capital on who remains at home], Benavot (1989) [Education, Gender and Growth], Reichlin & Rustichini (1998), Becker et alia (1990) [Human capital, Fertility and Growth], Miyagiwa (1991) [Scale’s economies for the education and the BD problem] and Wong & Yip (1999).

³⁴ Regard the wage’s differentials, there are the works of Davies & Wooton (1992) and Engerman & Jones (1997). Regard the income’s taxation, there is the paper of Wilson (1992). Regard different individual’s motivations to migrate, there are the works of Bernabou (1993), Acemoglu (1996), Carrington et alia (1996) and Davenport (2004). Furthermore, there are several themes analysed: the migration linked to the endogenous moving costs, the themes of Efficiency and Equity in the relationship between HDCs and LDCs [Bardhan (1996)], the influence of the income on the high education [Heckman et alia (1996)], the debate about the private and public schools [Arum (1996)], the Income and its implication on the convergence in the industrial development of the countries [Goodfriend & McDermott (1988)], and, finally, the Urban Growth [Black & Henderson (1999)].

³⁵ There are the articles of Abu-Rashed & Slottje (1991), Wei-cheng Wang (1995) [he analyses the migrations in Taiwan and if it is opportune define them BD or Brain Gain], Stark, Helmenstein & Prskawetz (1997, 1998), Mountford (1997), Straubhaar & Wolburg (1999) [he analyses the migration from Eastern Europe to Germany], Straubhaar (2000), Stark & Wang (2002) and Stark (2004).

³⁶ Regard the historical analysis, there are the works of Heaton (1965), Crouzet (1971) [Europe’s History], van de Walle (1974) [History and Demography], Rostow (1985) [Stylised historical analysis of the Worlds Economy until the 1945], Heilbron & Kevles (1988) [Science and technology in the USA History Textbooks] and Lund (1998) [Industrial Strategy in the History (UK)]. Furthermore, there are the articles of Etzioni (1966) [guidance of science], Nelson (1968) [Models of international productivity], Dror (1970) [Models of the decisions’ analysis], Farid (1974) [childbearing], Crafts & Ireland (1976) [changes in Age of Marriage in UK], Morauta (1979) [New Guinea], Fahim & Helmer (1980) [LDCs], Katz & Stark (1987) [International Migration under Asymmetric Information], Shore (1992) [anthropology], Khanna & Iansiti (1997) [Firm Asymmetries and sequential R&D] and Ades & Di Tella (1997) R&D and Corruption.

Several books analyse the BD phenomenon. In the 1960s there are the works by Becker (1964) [about the Human Capital and the Education], by Adams (1968) [general topics on the BD] and by Brass (1969) [population, Growth and BD]. In the 1970s there are several books by Bhagwati and others authors³⁷. Finally we have the work by Bhagwati & Wilson (1989) “Income Taxation and International Mobility”.

3 Conclusion

The objective of this survey is to propose an ideal path that connects the first studies on the BD in the 1950s with the most recent papers. In the first part of the paper we analysed deeply the BD and its main definitions. In the second part we studied the historical roots of the BD. In the third part we analysed the “geography” of the BD and the several economic models. Finally, it is possible propose the ideal path of the BD literature. To better understand the evolution of the BD, it is necessary to use the evolution of the HC literature. In what follow we expose this path.

When the HC literature analyses the social aspect of Education, studies on the BD analyse the impact of the high skilled migration on the Social Welfare. The first countries analysed are the West Europe’s ones, USA and the Canada. Several studies analyse the BD in the UK, which is the country where BD phenomenon appears in the first time. The results of these studies are the following: the main motivations to migrate were political and social; the effects of these migrations are bad either for welfare or for the social structure of the sending countries: the solution is to create and fortify the role of the International Organizations and Institutions on the management of the migration flows.

When the literature recognizes the importance of the HC in the National Account and the fact that it is a very peculiar productive factor, then these studies analyse the impact of the BD on the international commerce, on the Labour market, on the provision of public goods and on the taxes. These studies analyse mainly LDCs and emerging countries. The results of these studies are the following: the main motivation to migrate was the fact that the Labour markets are incomplete and not able to employ high skilled workers: the effects of these migrations are bad for the development of the sending countries; in the short run the tax system of the LDCs country fails: the solution is to fortify the coordination between LDCs and HDCs and to introduce BD taxes to compensate the negative externalities (Bhagwati’s tax).

When the literature recognizes the importance of the HC as main factor of the Growth, then these studies analyse the impact of the BD on the Growth and on its Macroeconomic implications. These studies analyse mainly LDCs but several works analyse also the HDCs. The results of these studies are the following: the main motivation to migrate was the more productivity (and higher income) of the skilled workers in the HDCs; the effects of these migrations are bad for the Growth of the sending countries; in the long run increase the divergence between the HDCs and LDCs: the solution is to create incentives for the workers to come back by increasing the opportunity to work in the LDCs and by decreasing the productivity’s gap.

When the literature analyses the role of the HC in the IT, then these studies analyse the impact of the BD on the Innovation, Technology and on its Microeconomic implications. These studies analyse either LDCs or HDCs. The results of these studies are the following: the main motivation to migrate are linked to individual aspects (income, vote with their feet, social, private, etc): the effects on the Growth of these migrations are not certain, they can be Bad or Good (Brain Gain). They are bad for the Growth of the sending countries as they increase the divergence between the HDCs and

³⁷ There are the work of Bhagwati (1976), entitled “The Brain Drain and taxation” in which there are most of the articles quoted in the previous chapters, Bhagwati & Patrington (1976) entitles “Taxing the Brain Drain: A proposal”, Bhagwati (1976) “In The Brain Drain and Taxation, vol 2. Theory and Empirical Analysis”, Hamada (1977) “Taxing the Brain Drain: a global point of view The new international order”, Grubel & Scott (1977) and Glaser (1978) “The Brain Drain: Emigration and Return”.

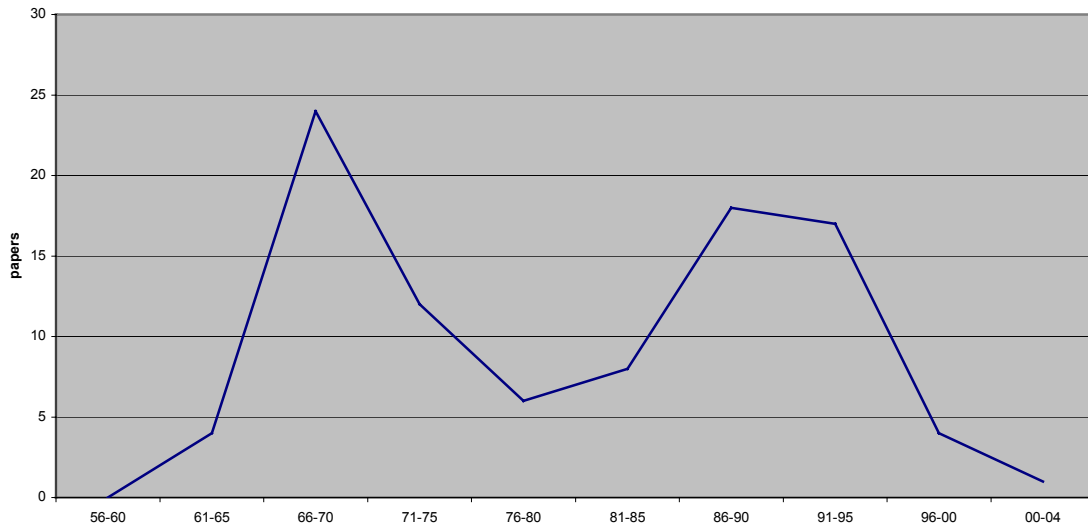
LDCs in the long run: the solution is to create individual incentives for workers to come back, an international coordination and, when it is possible, to create the conditions to have a Brain Gain.

The table below sums up these conclusions.

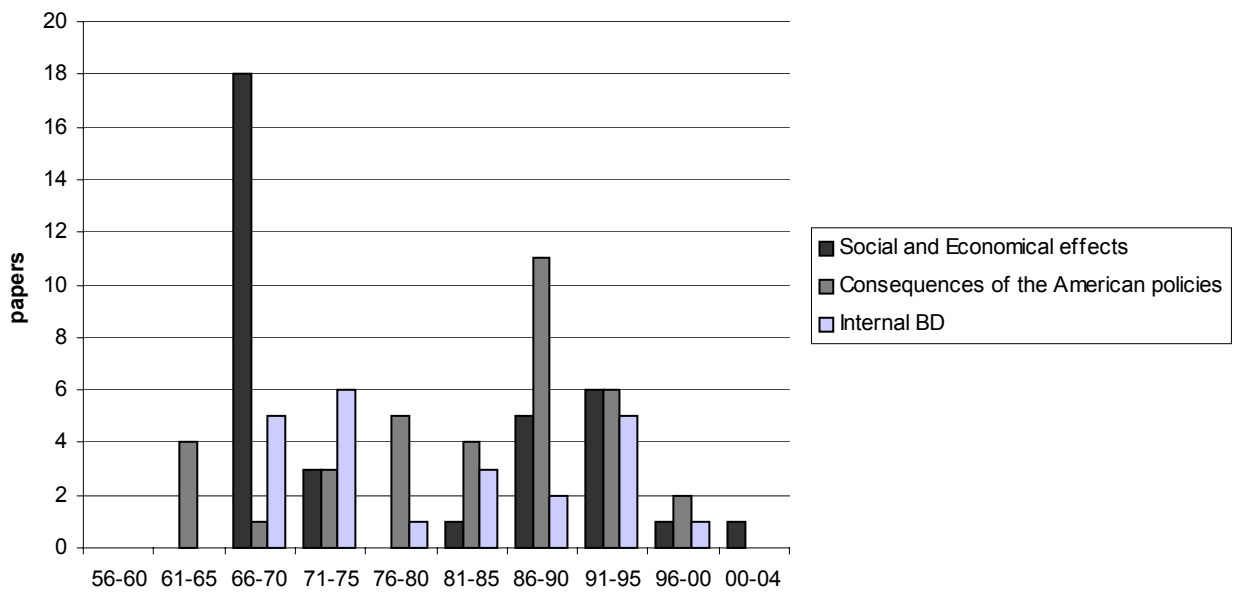
Human Capital (HC) and Education	Social Aspects of the Education	Education implies HC HC is a very peculiar productive factor	HC is an important component of the Economic Growth	HC and its effect on technology and Progress
Brain Drain's Studies				
<i>Topics</i>	Social Welfare	International Commerce - Labour Market – Public Goods - Taxes	HC and Growth (LDCs and HDCs) + MACRO aspects	Innovation, Technology and Growth + MICRO aspects
<i>Countries</i>	UK, West Europe, USA and Canada	LDCs and HDCs (few)	LDCs and emerging countries	HDCs and LDCs
<i>Motivation to Migrate</i>	Political and Social	Market incomplete or inadequate to employ skilled workers	More productivity (and so income) of the skilled workers in the HDCs	Individual motivation (income, vote with their feet, social, etc)
<i>Effects and Consequences</i>	Bad effect on the welfare, on the social structure and on the population	Bad effects on the economy and on the development (Short Run effect on the taxes, on the unemployment, etc)	Bad Effects on the economy and on the Growth (Long Run effects, increase of the divergences between LDCs and HDCs)	Bad Effects and Good Effects (Brain Gain)
<i>Solutions</i>	International Organizations and Institutions	Coordination among States and BD taxes to compensate the externalities	Incentives to coming back and increase the opportunity to work in the LDCs	Individual Incentives Implement the conditions to have Brain Gain

Appendix

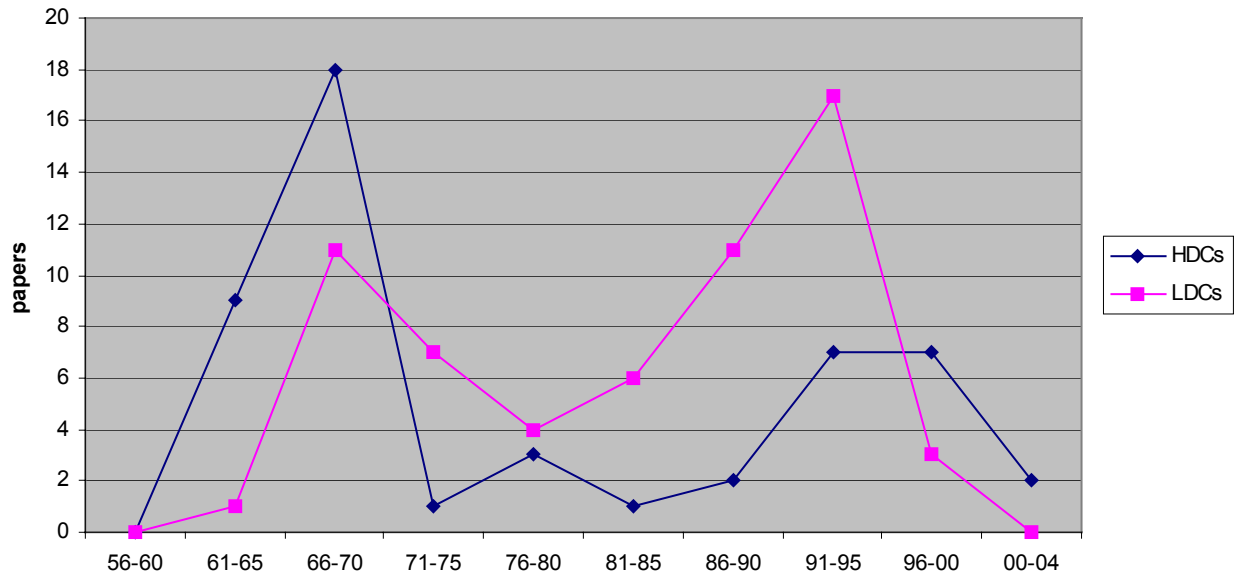
BD and USA - Figure 1



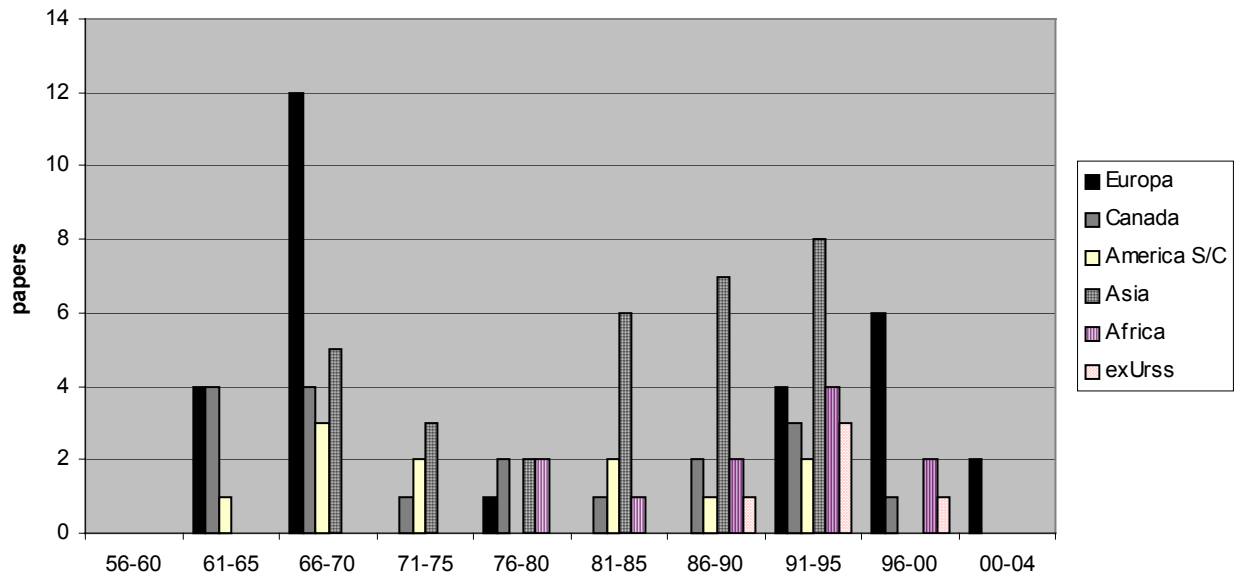
BD and USA - Figure 2



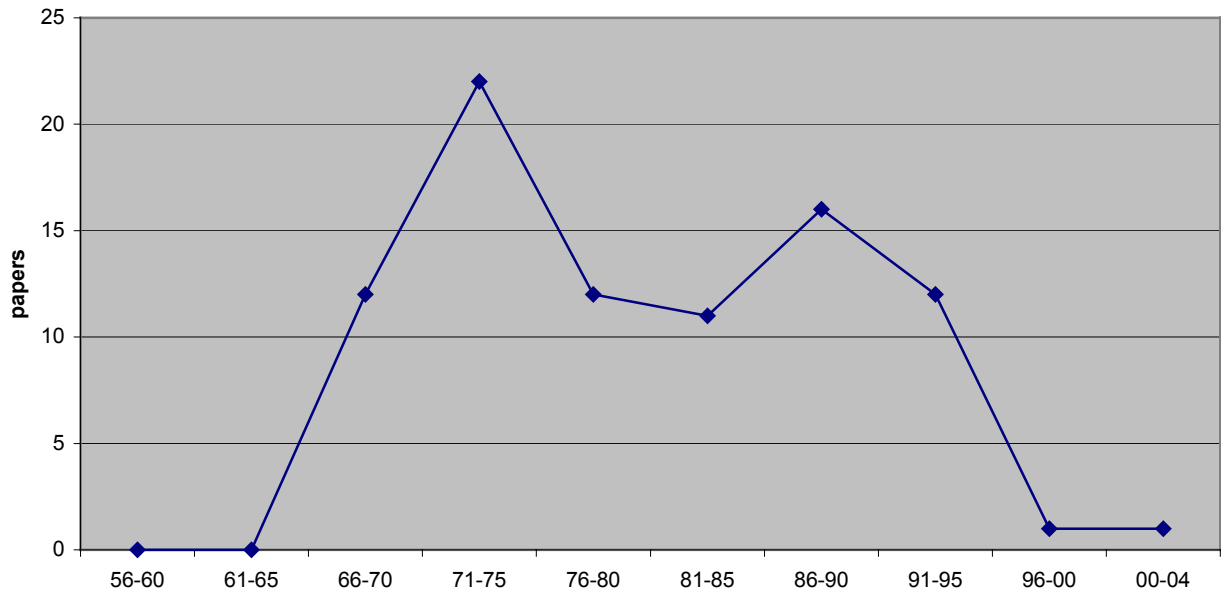
BD in the rest of the world - Figure 3



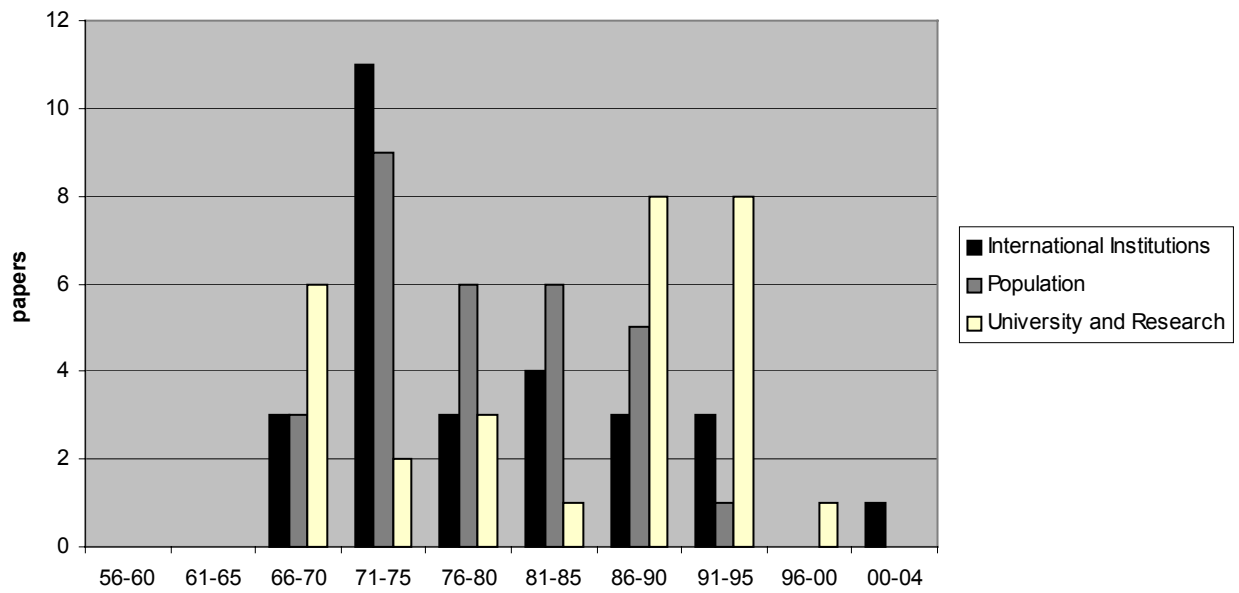
BD in the rest of the world - Figure 4



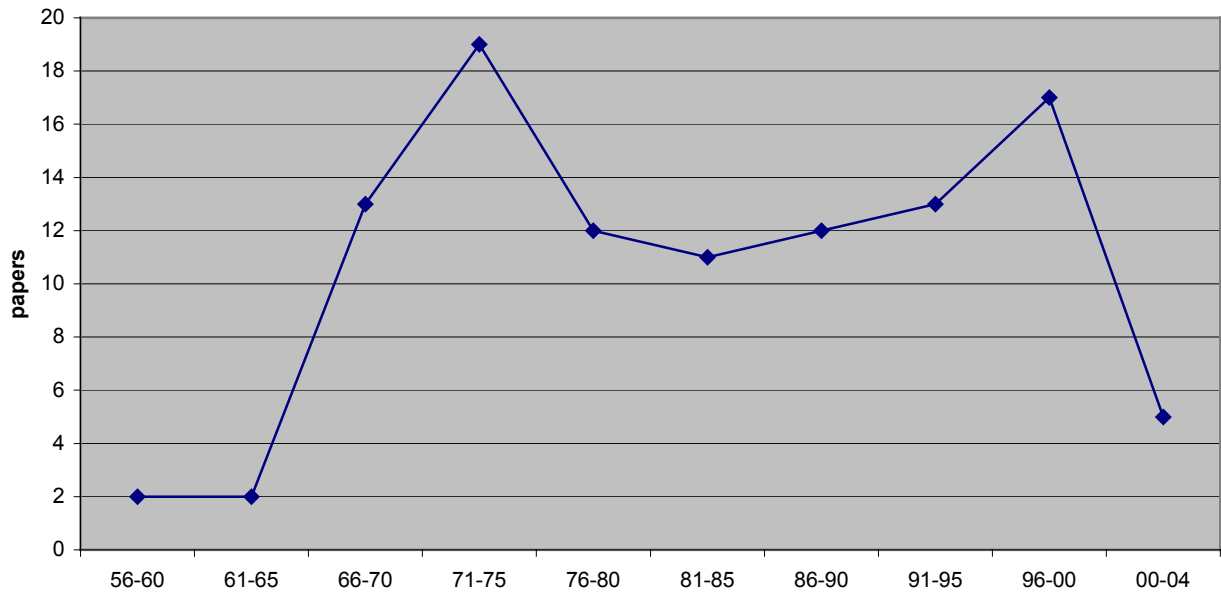
BD and International Coordination - Figure 5



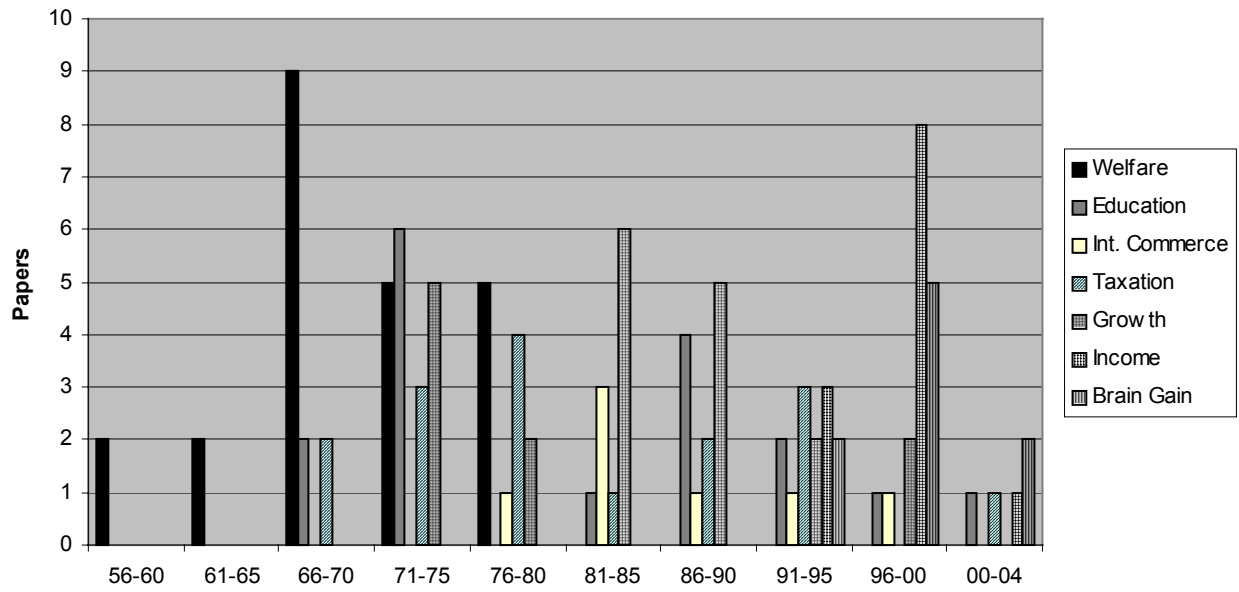
BD and International Coordination - Figure 6



BD's Models - Figure 7



BD's Models - Figure 8



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