

The Kiel Institute for the World Economy
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Kiel Working Paper No. 1381

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by

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October 2007

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Rules for Border-Crossing Factor Movements

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Abstract: This paper analyzes rules for international factor movements, i.e. real capital flows together with the relocation of firms, the flow of technology and the migration of people. These rules have to make sure that individuals, individual countries as well as the world economy benefit from factor flows. They also define whether factors are accumulated, for instance whether new technology is found. Except for TRIMS, an international investment code has not been established. Conventions have been introduced to ease patent applications. TRIPS protects intellectual property. Rules for labor migration relate to the right of exit and to conditions of entry. Factor movements are interdependent among themselves and with trade. This implies a pecking order between trade, capital flows and migration.

Key words: International rules, institutional arrangements, capital flows, technology, patents, intellectual property rights, migration, pecking order between trade and factor flows.

JEL: F2, K, O3, P.

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Rules for Border-Crossing Factor Movements

Whether rules for international factor movements are necessary depends on which role border-crossing factor mobility plays in the international division of labor. It can be argued that the need for rules increases with a higher mobility of factors, unless factor mobility can be considered to be a normal affair that can be left to the market. Factor movements include capital flows together with the relocation of firms, the flow of technology and the migration of people. These movements can be explained by different economic opportunities for factors in different countries, i.e. different rates of returns for capital and technology and different real wages for labor. Such differences in the rates of return and real wages can be traced to the divergence in factor endowment, production possibilities and demand conditions. They lead to factor movements if they overcompensate the costs and risks associated with the mobility.¹

Endowment with factors of production is not a given constant. Countries can accumulate factors of production, for instance built up their capital stock, develop their technology, increase their work force and improve their human capital. They also can attempt to attract mobile factors, using institutional arrangements, taxes, and infrastructure in the widest sense, including the education system and universities. Consequently, countries compete in locational competition for mobile capital, mobile technological knowledge and mobile qualified labor.

Rules for capital movements

Similarly as rules for trade, rules for capital flows have the role to allow benefits for the world economy as well as for countries exporting and importing capital. In the world economy, capital should be able to move to the most efficient use. Hence world GDP will rise. For the capital-exporting country a higher income can be earned by investing abroad than investing at home, if capital productivity (F_K , an asterisk * denoting the foreign country) is larger abroad, $F_K^* > F_K$, or the real interest rate in the world capital market (r^W) is higher than productivity at home, $r^W > F_K$. Moreover, capital exports allow consumption smoothing over time. For instance, a society facing an aging population can invest abroad today in order to enjoy income later on in old age. At the same time, the capital-importing country has the benefit of

¹ I appreciate critical comments from Steffen Elstner.

accumulating capital earlier than it would be possible through its own savings, i.e. $F_K^* > r^W$. The country can produce more. Its labor is equipped with more capital, and labor productivity is raised. For instance, the US imported capital in the 19th century to build up its capital stock; today China and other emerging countries have an advantage from foreign direct investment. In addition, consumption smoothing of the capital-importing can prevent the impact of a severe economic downturn or a natural disaster. These arguments are similar to those for the gains from trade. Capital flows exploit differences in countries' characteristics, such as age structure of the population, savings behavior, investment opportunities and risk profiles. Moreover, capital flows are linked to technology transfer and can increase the competitiveness of the capital-importing country.

International border-crossing capital flows amount to only below one tenth of world gross investment, the overwhelming part coming from national savings. Individual countries may succeed in financing up to fifty percent of their gross investment in specific periods, for instance Hungary in 1995 (Siebert 2007, Chapter 3).

When we here speak of rules for capital flows, we are talking of real capital flows, i.e. of the allocation of savings and foreign direct investment and not of portfolio flows. Portfolio flows require their own rules. Admittedly, real capital flows and portfolio flows are interrelated, for instance bonds and credits may prepare the road for foreign direct investment. But the main problem of rules for portfolio flows is financial stability.

As a consequence of the benefits from capital flows, a competitive order should be the basis for rules on capital flows. According to this paradigm, it is reasonable that countries compete for the mobile capital through tax competition and institutional competition by making themselves attractive for mobile capital (Siebert 2006).² Governments can influence the attractiveness of a location by improving or extending the supply of public goods, by providing infrastructure in transportation and in education, by improving soft location factors, by taxation and by institutional regulations. A large part of competition among locations takes place in the form of institutional competition in the regulatory framework that determines the way things have to be done in a society. These institutional rules can be formal norms, such as constitutional requirements, modes of collective bargaining or the procedure of licensing

² Krugman's statement (1994: 41) that competitiveness is "... a largely meaningless concept..." is a serious misjudgement of the profession.

firms, of production processes and of products, as well as informal aspects, such as non-codified, habitual behavior.

All these parameters influence the location decisions of firms and residents. The task of the government is to find an optimal instrument mix in its calculus of locational competition. For instance, it is necessary to weigh the advantages of the supply of public goods against the burden of financing them. A generous supply of infrastructure does not increase the attractiveness of a location unless taxes on mobile factors are kept at a reasonable level. However, a country that levies very low or no tax at all on business activities may nevertheless be less able to attract mobile factors if the infrastructure is not sufficiently developed. In comparing costs and benefits, governments have to take into account the fact that capital and other factors as well as residents have an exit-option if conditions at home become less favorable. This restraint changes the calculus of governments. They have to take into account the fact that capital (and other factors as well as residents) have an exit-option if conditions at home become less favorable. Attempts to reduce this type of competition, for instance by limiting tax competition, are inconsistent with exploiting the benefits from capital movement.

Some fear that competition between locations will necessarily lead to a negative downward spiral, or as “race to the bottom” as some call it (Brecher and Costello 1994). It is indeed true that the exit-option of the mobile factors of production introduces a new restraint on the nation state and reduces its room to maneuver. Mobile factors can escape national taxation. This means that the nation state will inevitably lose part of its power to tax. With the exit of each unit of capital, there is a reduced willingness to pay of firms for the national public good. However, there are limits to this process. Firms remain willing to pay taxes if sufficiently attractive public goods are supplied. Moreover, the state can adjust the financing of its location factors, for instance by introducing user charges for infrastructure such as roads, ports and airports. Additionally, it is possible to privatize parts of a previously publicly owned infrastructure in order to set scarcity prices for infrastructure. Or, the government can switch to benefit taxation, which means that taxes are equivalent to the benefits received by users and not to the ability to pay. Finally, the nation state can change the structure of its tax system to lean more on indirect taxes, explicit consumption taxes and taxes on immobile factor.³ All these responses can counter the spiraling-downward process. Similarly, countries do not have

to weaken the regulations that protect individuals and the environment. If the reasons for regulation are sufficiently tailored to the preference function of the country's citizens, regulations will be upheld.

In contrast to the view of competition between locations as a race to the bottom, it can be interpreted as a useful mechanism to control the efficiency of governments and as a discovery device in the sense of Hayek (1968). Competing for mobile factors puts pressure on countries to find new solutions, for instance by implementing new institutional arrangements or by exploring new technological horizons. It stimulates the imagination and intensifies search effort to find solutions. Moreover, in this view, the technological or institutional solutions employed in the different locations can be explicitly compared. Seeing positive or negative examples from elsewhere may encourage a country to do better than it actually performs. One aspect is that countries can mimic approaches used already successfully elsewhere. This is why "benchmarking" has become a key concept in the reform programs of several continental states in Europe; note, however, that the benchmarking strategy does not mean to search the new institutional frontier.

To ban capital invested in a country as well as domestic savings from leaving a country has severe negative consequences and false incentives in the long run. National income and the income of capital owners will be reduced. The country renounces the option of consumption smoothing. Residents have less motivation to save and accumulate capital. They also have a stimulus for capital flight, for instance through under-invoicing their exports while receiving shadow side payments from their export partners. Foreign direct investment is less inclined to come, according to the economic law that an exit constraint from the market always represents an entry constraint. Especially, if the risk of expropriation or the risk of a severe increase in business taxes is anticipated, foreign direct investment is unlikely to come.⁴ Moreover, uncertainty for investment may be a cause for uncertainty in trade. Each country should therefore structure its institutional framework for saving and investment in such a way that domestic capital wants to stay and foreign capital wants to enter. This requires to provide for the security of property rights, avoid uncertainty about expropriation and increases in

³ The Scandinavian concept of dual taxation, which places lower tax rates on the internationally mobile factors of production, is already an answer to this problem.

⁴ In the case of Chile, severe entry conditions even for portfolio capital requiring a non-interest bearing deposit of 30 percent had a negative effect the inflow of equity capital and had to be given up. Malaysia's entry constraints of 1998 for portfolio capital could only be used temporarily.

corporate taxes and develop a tax system and a general economic framework that make the country less risky and more attractive for foreign direct investments.

It may be argued that it is the host country's own responsibility to enhance its attractiveness, and that this is not a concern for international rules. However, it is helpful to have an investment code in order to minimize disruptions. A first aspect is that investment uncertainty should not spillover to trade; that is why trade-related investment measures (TRIMs) are needed.

The TRIMS agreement, in effect since 1995, prohibits countries making the approval of investment conditional on compliance with laws or administrative regulations that favor domestic products. It addresses investment measures that are trade related and which violate Article III (National Treatment) or Article XI (general elimination of quantitative restrictions). Violations are not defined but explained by an illustrative list. Existing obstacles, after having been notified to the WTO, had to be eliminated in a transition period. New WTO members agreed to eliminate existing obstacles.

TRIMS is not sufficient to improve capital mobility. In addition, rules should allow capital and profits to be repatriated and make foreign direct investments of the sending country more secure. They should be more comprehensive than trade-related investment measures and can lend reliability to a country, for instance by protecting foreign direct investments against expropriation in the case of a change in government. It can be argued that a two-speed approach should be recommended for an investment code, with the OECD countries going ahead and the WTO following. In any case, eventually an investment code should be administered by the WTO. So far, the OECD has not succeeded to establish an international investment code (2007). The WTO has not made progress beyond TRIMS.

A major concern against foreign direct investment is the fear of foreign infiltration or even foreign domination. One apprehension is that the economic interest of other countries and not the national domestic economic interest plays the decisive role. This concern doubts the economic benefits of free international capital markets. Meanwhile, capital markets are integrated globally; in the euro area and also in the European Union a deepening of the capital market is a deliberate aim of integration. For instance, in the major thirty German stock companies listed on the Frankfurt stock exchange (DAX companies) with wide-spread

disperse ownership the majority is now owned by foreign stock holders, not only from the euro area. After all, this brings advantages to the firms, such as the access to foreign capital, making them independent from national financing constraints, and possibly contact to foreign technology. Firms become more competitive. This at least partly outweighs the risk that foreign investors, for instance the Chinese, siphon off the technological knowledge. Concerns about foreign infiltration usually attract public attention and die down eventually. For instance, opposition against American foreign direct investment in the late 1960s in France (Servan-Schreiber 1967) was forgotten a decade later.

Another concern is that equity and hedge funds have short-sighted interests. They buy up firms, restructure them and sell them again in order to make a profit. If they succeed in exploiting the restructuring potential, they represent an efficiency gain for the economy. It cannot be ruled out that private equity and hedge funds load up the firms they bought with credits and manage to find buyers for the credit-loaded firms in the market, for instance in a merger hype. Admittedly, this represents a degeneration. However, the price to pay in order to prevent such a deterioration is to close a country off to foreign equity and foreign direct investment. It is a different story that credits to equity and hedge funds given by banks must show up in the balance sheets of banks where they should be consolidated; this is an issue relating to financial stability. A related major concern is that capital drives out labor. However, in the long run jobs only are sustainable if they find the support of capital. If not, workers will not be equipped with new capital and new technology. Then jobs will not persist. Therefore, capital mobility does not go against labor. To sum up, private foreign direct investors should receive equal treatment as domestic investors.

Another key worry is that foreign political interests are in conflict with national political interests and may clash with national policy at some time in the future. This is a relevant question when state-controlled agencies of foreign countries, i.e. sovereign wealth funds, are the foreign investors. Such wealth funds do not represent a matter of concern if they follow pure economic interests, for instance when a country wants to reinvest its current account surpluses, such as its oil surpluses. It does not make sense to limit surplus countries to accumulate currency reserves or to channel the reserves into international liquidity of the banking system; remember the debt crisis of the developing countries in the 1980s which was the result of petro-dollar recycling in the financial markets. Moreover, sovereign wealth funds do not represent a problem if they seek to optimize their returns on accumulated assets and

spread their risks. They are also less of a concern when they invest in bonds and other portfolio capital instead of buying equity or investing directly in firms. And they do not represent a major problem if they follow the target of consumption smoothing when investing in real estate and equity.

However, it is realistic to take into consideration that foreign governments have political interests beyond the economic domain. Then the issue becomes more tricky. State agencies can be instrumentalized by strategic foreign policy interests and a country may get into the position of being held ransom by sovereign wealth funds and their governments. Foreign policy conflicts between states may interfere with the economic situation and may threaten the sovereignty of a nation state. Therefore rules for foreign direct investments by state-controlled agencies are desirable in areas where national sovereignty is at stake.

In order to determine where rules are needed (and where they are acceptable) it is important to know the size and the type of state-controlled foreign direct investors. Sovereign wealth funds or gold sovereigns are estimated to have assets of 2.3 trillion US dollar in 2007, mainly from international reserves of oil countries and Asian economies (Table 1).

Table 1: Sovereign Wealth Funds, assets, \$bn ^a

Country	Fund	Assets, \$bn	Inception year
UAE	ADIA	875	1976
Singapore	GIC	330	1981
Saudi Arabia	Saudi Arabian funds of various types	300	na
Norway	Government Pension Fund - Global	300	1996
China	State Foreign Exchange Investment Corp. and Central Huijin ^b	300	2007
Singapore	Temasek Holdings	100	1974
Kuwait	Kuwait Investment Authority	70	1953
Australia	Australian Future Fund	40	2004
US (Alaska)	Permanent Fund Corporation	35	1976
Russia	Stabilization Fund	32	2003
Brunei	Brunei Investment Agency	30	1983
South Korea	Korea Investment Corporation	20	2006

^a March 2007. – ^b Not yet finalised

Source: Morgan Stanley 2007.

About three quarter of sovereign fund assets belong to oil countries, above all the Middle East (1.3 trillion US dollar), Brunei and Norway (0.3 trillion US dollar). Australia's fund also is future oriented; this also hold for Temasek Holdings which manages the Singapore's government direct investment, both locally and overseas, and is commercially oriented. It is most likely that all these funds have an overwhelming interest in economic returns. This also applies partly to the new fund of 300 \$bn started by China in 2007 although the focus will also be on the acquisition of technology and access to natural resources. Russia's stabilization fund only accounts for 30 \$bn; nevertheless government-controlled Russian firms can act also act as foreign direct investors.

Rules to defend national sovereignty should not be a catch-all for protectionism against foreign direct investment. They should be restricted to specific areas. These areas are national security, including military equipment, and energy with national security justifying more restrictions than energy.⁵ In the energy sector itself, production, transportation networks, i.e. electricity and gas networks, and distribution facilities have to be distinguished, again justifying different degrees of control. Telecommunication where competition prevails needs definitively less protection; it can be checked by competition policy. Infrastructure such as railroads, sea ports and major national airports, are partly controlled by governmental authorities, anyhow. In the energy area, not all foreign direct investment of sovereign funds in the energy area should be disallowed. Thus, cross foreign direct investment between the European Union and Russia, i.e. EU investment in Russia's upstream and Russian foreign direct investment in EU's downstream activities, may well represent a solution of mutual interest. Also, conditions can be established that limit the political influence of foreign direct investment, for instance in the energy sector, to capital ownership without operational influence; an example are non-voting shares. Moreover, strategic economic behavior of foreign direct investment can be controlled by such policy instruments as competition policy and regulation, for instance network or banking regulation.

It is important that limits for foreign direct investment do not extend to sectors beyond those mentioned. They should not apply to sectors that simply seek economic protection against

⁵ As an example compare the US Foreign Investment and National Security Act of 2007 which lays out the process by which the US government reviews and consequently approves or disallows "covered transactions". These transactions involve US companies acquired by foreign entities. In the review it must be decided whether the transaction involves a threat to national security (Adams and Reese, LLL 2007).

foreign competitors in the capital market. This means that policy instruments relating to all sectors of the economy should not be used. For instance, national governments should not introduce a regulation whereby they retain the general right to license foreign sovereign funds to engage in buying up domestic firms. Nor should they retain a general right to be informed of all foreign direct investments by sovereign wealth funds, notwithstanding which sector is concerned. Political risks would be reduced if sovereign wealth funds invested through intermediary asset managers interested in risk management as is the case by pension funds (Summers 2007).

An international rule system for foreign direct investment should limit itself to a few sectors and should avoid to include many sectors that simply seek protection. Bilateral reciprocity, i.e. to open up only those sectors that are also opened up abroad, is too weak an approach to be used as a foundation for an international rule system. In the EU, care should be taken that a general rule in this area does not follow the French doctrine of state intervention and the reluctance of Italy and Spain to open their markets to foreign direct investment, even if it has purely economic aims.

Rules for technology

Global rules for the area of technology have to make sure that the countries of the world and the whole world can benefit from technological knowledge. This means that the rules have to define sufficient incentives so that new technological knowledge is produced as inventions and applied as innovations.

Knowledge, including technological knowledge, can have different properties: It can be a private good, available only to an individual or to an individual organization, for instance a firm, or it may be a public good that can be used in equal amounts by all. Instead of a public good we may also speak of a free access good since knowledge may be used differently by different individuals. Examples of a private good are information available to one person only, an individual invention or an investment by a firm on the basis of a specific technology. Examples of knowledge as a public good are the results of basic research, for instance of university institutes, where the understanding is that such knowledge should be available to all researchers world wide. The lines between knowledge as private and a public good are not clear-cut. Thus, states may attempt to shape their diffusion process from basic knowledge to

applied knowledge in such a way that the basic knowledge remains within their national borders, specifically in their firms. Or the results of basic research may be patentable so that they become private goods. Private firms may undertake basic research as a precondition to find inventions that they can apply in innovations, keeping the results to themselves.

Besides intrinsic motivation, for instance, the motivation of a scientist to become famous or to improve the conditions of mankind, the core of the incentive issue in decentralized economies is which enticement the rule system provides for the individual inventor to find a new technology and for an innovating firm to apply a new technology. The inventor is rewarded with the intellectual property right to his invention; the firm is protected against imitation if it has obtained the property right to a new technological idea from the inventor or through its research.

Property rights usually are rights of individuals and of firms, not of governments. Property rights relate to all sorts of intellectual property: patents, copyright and associated rights, trademarks, industrial design, the layout designs of integrated circuits and geographical indications (like appellations of origin). They represent exclusive rights given to the creator over the use of his or her creation for a limited period of time. The owner of a patent, copyright or other form of intellectual property right is given the right to prevent others from using his inventions, designs or other creations — and to use that right to negotiate payment in return for others using them, i.e. issuing a license.

Patents cover inventions. Most of the value of high technology products including new medicines lies in the amount of invention, innovation, research, design and testing involved. Patents must be available for both products and processes, in almost all fields of technology. If a patent is issued for a production process, then the right must extend to the product directly obtained from the process. Copyright and associated rights are granted to authors of literary and artistic work and the right of performers, producers of phonograms and broadcasting organizations. Thus books, paintings and films come under copyright. Trademarks extend to brand-names and product logos. Industrial design rights offer protection for the visual design of objects. Layout design rights protect the layout of semi-conductors and integrated circuits. Geographical indications as “Champagne”, “Scotch” and “Roquefort” cheese are place names that identify a product’s special characteristics, which are the result of the product’s origins.

These intellectual property rights differ markedly from the ownership of assets, for instance stocks and bonds, of physical capital, as machines, enterprises and land. These traditional property rights have an unlimited duration. In contrast, institutional rules in the area of technology cannot be granted for an unlimited time, since this would allow the owner of the property right to have a monopolistic market position and to exploit the demand side of the market. In a national patent system as well as in international arrangements, there are two diverging interests: On the one hand, user rights to new technological knowledge must be secure, since otherwise there will be an insufficient incentive for the potential inventor to search for a new technology. There will also be a weak motivation for an innovator to acquire the patent and adopt the new technological knowledge in an investment. On the other hand, this property right protection must not create a permanently exclusive monopolistic market position and make markets uncontestable.

Usually patents are granted for twenty years. Copyrights have a duration of the life of the author plus either 50 or 70 years. Producers of sound recordings have the right to prevent the unauthorized reproduction of recordings for a period of 50 years. Industrial design holds for ten years. Layout designs of integrated circuits are protected for at least ten years (according to TRIPS). Trademarks dilute in the market process. Geographical indications usually hold for a long time unless the identity of the product is watered down.

The economist could sit down at a drawing board and develop a rule system for the global economy, looking for the ideal incentive structure of such a system with the crucial role to extend the technological frontier of individual countries and of the world. Instead of such a constructionist approach from above it is more promising to study how national intellectual property rights have been established and how elements of a global system have developed in a Hayekian way from below. The most important cases are patents.

In a world with many national patent systems national procedures are likely to diverge. Under such conditions, an individual inventor has to apply for a patent at each national patent office, following the national procedures in every one of the countries separately. In addition, an innovator does not have certainty of exclusive use. This problem is eased by a series of international conventions.

The Paris Convention (1883) established the very important right of priority in the area of patents and industrial design. This gives someone filing an application the filing date of the first application as the effective filing date for the later applications. The Berne Convention of September 1886, amended several times, the last time in 1979, protects literary and artistic work. The Rome Convention, done in 1961, protects performers, producers of phonograms and broadcasting organizations. The Patent Cooperation Treaty, concluded 1970 and having 122 members by now (among them all members of the European Patent Convention), has established the World Intellectual Property Organization, seated in Geneva, and its administrative arm, the International Bureau. It administers such treaties as the Paris and the Bern convention and its function is to promote intellectual property protection. It allows to centralize certain procedures of a patent application. The applicant needs only to file one single patent application in which he indicates ("designates") all the countries in which he wants to have patent protection. This is checked by the World Intellectual Property Organization which receives the patent application. The organization, which came into force in 1970 and turned into a specialized agency of the UN in 1974, then appoints one of the major patent offices in the world, usually the US Patent and Trademark Office, the European Patent Office or the Japanese Patent Office, as the international search authority which then performs the literature search. The International Bureau then prepares the report which has the role of an opinion and is not binding. Optionally, the patent office that performed the search can issue a preliminary opinion on the patentability. After a successful search, the applicant can continue the procedure at the National Offices of the countries he designated. He has up to thirty months for this. In spite of this easing of the procedure, the national examiners apply their own country's national standards for patentability.

According to the European Patent Convention (concluded in 1973), establishing the European Patent Organization and the European Patent Office, provides a unique application procedure for individual inventors and firms seeking patent protection for up to 37 countries. An applicant files a single European patent application and designates the countries in Europe in which he wants to have patent protection. The European Patent Office performs a novelty search and prepares a search report. This has only to be performed once regardless of how many countries were designated. The Examining Division then determines the patentability of the invention. If a European patent is granted, it grants the applicant, in the countries he designated, the same rights as would have been granted in the case of a national application. Also non-EU members can be a party to the European Patent Convention. Once a European

Patent has been granted, anyone has the right to oppose it within nine months after grant. If the patent is then found to be invalid, it is revoked in all countries simultaneously. After these nine months, the patent can only be revoked separately for each country in which it was granted. Consequently, a European patent effectively grants its owner national patents in every country that is party to the European Patent Convention (or those countries the owner designated). In particular, a European patent can only be declared invalid by a court in one country for that specific country. This means that someone wanting to invalidate a European patent that was granted in 18 countries must start 18 separate court proceedings. Note that Europe does not have an equivalent of the US Court of Appeals for the Federal Circuit, which means that in principle every country can rule differently on patent matters. There are some restrictions.

These patent conventions show that historically institutional rules converge to some extent through some common principles and through mutual recognition. Also, one or several dominating models may take the lead.

In spite of these efforts to make patent rules more lean internationally, differences in countries' intellectual property rights represented a source of frictions in international trade; creators of intellectual property and firms using the intellectual property in innovations were not protected. This represented a major distortion in the international division of labor. The WTO's TRIPS agreement (Trade-Related Aspects of Intellectual Property Rights), introduced after the Uruguay Round in 1995, is an attempt to narrow the gaps in the countries' intellectual property rights and to establish minimum levels of protection that each government has to grant to the intellectual property of fellow WTO members. Members may give more protection than minimum standards as long as this does not contravene the provisions of the agreement. They can determine the method they want to use. The WTO members must also comply with the main conventions of World Intellectual Property Organization. This is why TRIPS sometimes is called "Berne and Paris plus". Besides minimum standards of protection enforcement of intellectual property rights and dispute settlement on these rules are the main ingredients of the arrangement.

The TRIPS agreement starts from the basic principles of the trading system, namely non-discrimination, national treatment (treating one's own nationals and foreigners equally) and most-favored nation-treatment (equal treatment for nationals of all trading partners in the

WTO). The TRIPS agreement has an additional important principle: intellectual property protection should contribute to technical innovation and the transfer of technology.

The TRIPS agreement is integrated into the WTO. TRIPS is steered by the TRIPS Council comprising all WTO members. It is responsible for monitoring the operation of the agreement, for instance how members comply with their obligation. Laws of countries are required to be notified to the TRIPS council. TRIPS being part of the WTO, the WTO's dispute settlement system is now available, when trade disputes over intellectual property rights arise. This is a major improvement relative to the GATT where no specific agreement on intellectual property rights existed except for some principles that had bearing on intellectual property rights. TRIPS requires WTO member governments to ensure that intellectual property rights can be enforced under their laws, and that the penalties for infringement are tough enough to deter further violations. The agreement describes in some detail how enforcement should be handled, including rules for obtaining evidence, provisional measures, injunctions, damages and other penalties. Willful trademark counterfeiting or copyright piracy on a commercial scale should be criminal offences. Governments should make sure that intellectual property rights owners can receive the assistance of customs authorities to prevent imports of counterfeit and pirated goods.

The agreement contains provisions for special areas. Thus it ensures that computer programs will be protected as literary works under the Berne Convention and it outlines how databases should be protected. It also expands international copyright rules to cover rental rights. The agreement defines what types of signs must be eligible for protection as trademarks. It protects integrated circuit designs ("topographies"); the basis for this in the TRIPS agreement is the Washington Treaty on Intellectual Property in Respect of Integrated Circuits, which comes under the World Intellectual Property Organization. This was adopted in 1989 but has not yet entered into force.

The TRIPS agreement allows certain exceptions. Among them is compulsory licensing and government use of a patent without the authorization of its owner under certain conditions, if for instance a patent owner abuses his rights, for example by failing to supply the product on the market. Then a government can issue compulsory licenses, allowing a competitor to produce the product or use the process under license. Members are also allowed to exclude some types of plant and animal inventions from patenting in their countries, namely to

exclude from patentability “plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes”. Plant varieties, however, must be protectable by patents or by a special system (such as the breeder’s rights provided in the conventions of UPOV –the International Union for the Protection of New Varieties of Plants).

It is heavily debated whether poverty and disease stricken developing countries should have preferential access to advanced technology and products. The issue is not a general privilege for all advanced technology and for all advanced products but a privileged right to use medicine against major illnesses at lower costs, for instance against malaria or aids. This is the issue of technology transfer. In principle, flexibilities such as compulsory licensing are written into the TRIPS Agreement, but there is uncertainty with respect to interpretation.

WTO ministers agreed at the Doha Ministerial Conference in November 2001 that the TRIPS Agreement does not and should not prevent members from taking measures to protect public health. And they agreed to extend exemptions on pharmaceutical patent protection for least-developed countries until 2016. A waiver providing flexibility for countries that are unable to produce pharmaceuticals domestically to import patented drugs made under compulsory licensing was agreed on 30 August 2003. Developing countries have until 2016 to ensure that their laws and practices conform with the TRIPS for pharmaceutical patents.

The TRIPS Agreement includes a number of provisions on technology transfer which developing countries consider as part of the bargain in which they have agreed to protect intellectual property rights. For example, it requires developed countries’ governments to provide incentives for their companies to transfer technology to least-developed countries. Another issue is the diffusion of new abatement technology which helps to reduce emissions at the most efficient spot. In this case, it is in the direct self-interest of developed countries to spread the technology in order to reduce abatement costs.

Still, it is to some extent unclear what this means. One answer is that firms must provide products at a low or zero price to developing countries. Then firms act out of social responsibility. Another answer is that to support developing countries is a political issue of development aid, and that it is the role of governments in the developed countries and not of firms to finance aid, including medical aid.

An alternative to formal conventions in the form of international treaties are corporations in the special form of non-profit public benefit corporations. ICANN (Internet Corporation for Assigned Names and Numbers) is such a corporation. It is responsible for the global coordination of the Internet's system of unique identifiers. These include domain names (like org, museum and country codes like UK), as well as the addresses used in a variety of Internet protocols. Computers use these identifiers to reach each other over the Internet. Careful management of these resources is vital to the Internet's operation, so ICANN's global stakeholders meet regularly to develop policies that ensure the Internet's ongoing security and stability.

National technology policy is affected by the international subsidy code. In this code, limits should be set for industry-specific research subsidies in order to prevent international distortions through subsidies. In contrast, there is no need for controlling the improvement of the general conditions for research and development, for example, when countries generally introduce more favorable tax conditions for research and development, innovation, investment and entrepreneurial activity, as well as organize basic research and foster technology transfer so that they can be internationally competitive.

Rules for migration

Rules for the migration of people have the role to allow an increase in welfare for individuals, the world economy and for individual countries. The structure of the problem is similar to that of capital movements. Migrants gain by moving to a place where they have a higher labor productivity. The world gains by labor moving to places of its most efficient use. The welfare gains with respect to individual countries vary. The country receiving workers enjoys an increase in its GDP; capital income there rises whereas immigration suppresses the initially existing wage rate. The country of emigration experiences a decline of GDP; capital income there declines whereas the wage rate increases due to higher labor scarcity. Usually the country of emigration loses the most valuable and dynamic people, including scientists and entrepreneurs who are necessary for its development. Note that the impact on real factor prices also come about through trade, by countries specializing on the production and export of labor-intensive and capital-intensive goods.

Except for freedom migration because of political suppression and except for famine migration because of the risk of starvation, the movement of people is driven by income differences. The migrant applies an intertemporal utility or income maximizing approach. He deliberately or subconsciously maximizes the present value of utility or income for the remaining periods of his life or for a chosen period. If, for instance, the present value of income is higher at the new location relative to the old one, he will move. The migrant is likely to consider other variables such as the risk of becoming unemployed, either at the new or the old location. Moreover, the option value of waiting enters the picture. If a potential migrant expects the situation at his old location to worsen over time, the option value of waiting is negative and there is a greater incentive to migrate. If he expects the situation at his old location to improve, the option value of waiting is positive and the incentive to migrate is accordingly lower. Thus, the option value corrects the income difference. Thresholds in income differences also play a role: it requires a sizable income difference to stimulate migration. This rule applies independently of whether migration is demand-driven (as a consequence of a demand stimulus of the country of immigration) or supply-driven (as a consequence of an excess supply of labor in the country of emigration). It also holds for welfare migration in which the migrant compares market income and unemployment at home with welfare payments at his new location.

The right of individuals to leave a country, the exit option, can be interpreted as an important element of a liberal order. Individuals should not be walled in. From the perspective of political freedom, the exit right for people is more basic than the exit option for capital. Every individual should have the right to choose to leave, given living conditions which he or she finds unacceptable. All the countries should accept the exit option of people as a basic principle. A credible right to exit represents a limit on the actions of the government and implicitly controls the government.

Besides an outright political ban on emigration, governments can use other instruments to hinder people from emigrating. One is that emigrants are not allowed to take their valuables with them or do not receive compensation for their land property, either through political harassment or because of lacking markets. Another is to use tax obligations to prevent people from leaving. In principle, the citizens of a state must fulfill their tax duties when they take their residence abroad. However, it must be prevented to use tax duties as a device to keep potential migrants from leaving. Emigrants should not be discriminated against. Double

taxation treaties or multilateral agreements could help to ease these problems. In any case, the freedom of the individual should be given priority to the tax claims of the state. A related issue is that an individual has benefited in human capital formation from his home country. Again, the emigrant should not be discriminated against. A problem of discrimination arises if only the emigrants have to pay for their former education or if only they have to pay back credits from banks or governmental support and not all former students. This issue of human capital formation can be dealt with by international (private) law.

The exit option does not, however, imply an entry option, i.e. the right to migrate into a country. One reason is feasibility. Even if a country might be willing to accept and welcome all the migrants of the world, it usually could not, simply for lack of space. Another reason is human experience. Historically, land was overtaken by invaders who did not respect the property right of indigenous inhabitants. Conquests usually were the method through which migration took place. To respect the principle of territoriality can be understood to prevent such brutal migrations. Territoriality allows a nation state to define the rights of the insiders or the incumbents, specifying the degree to what extent migrants can come in. States define their identity by setting their immigration policy. It is hard to imagine that a democracy will define its immigration law against the majority of the voters. This means that the majority must accept immigration (Hillman 1994). In this sense, countries can be interpreted as a club with limited entry.

In this context, property rights to use land are relevant for immigration. They assign land use to those who have the title. With functioning land markets, immigrants can buy out the incumbents as owners of land over time. With the territoriality principle, the nation state and its citizens can also be thought of as owning the land and defining the conditions under which immigrants can live on this land. This creates difficult ethical questions, which can be more easily solved if potential countries of immigration – beyond the duty to accept the politically persecuted – are sufficiently open and if regional integrations such as the European Union, although only spatially limited from an international economic perspective, guarantee the freedom of movement within their territory. If not, countries close themselves off to immigrants.

The European Union has established the freedom of movement of people as one of its four freedoms for the single market. This means that a citizen of the a EU member state has, in

principle, the right to establish residence in any member state. Practically, the member states can ask for conditions. Thus, welfare migration within the EU is prohibited, i.e. moving for instance from unemployment in one EU country to higher welfare benefits in another EU country. Non-nationals can receive welfare payments only under certain conditions, for instance if they had established residence already for some time. The freedom of movements of non-EU asylum seekers is limited within the European Union. Moreover, the freedom of movement for Europeans is limited as the EU service directive shows.

A pecking order between trade, capital flows and migration

An important aspect for rules in the realm of factor movements is that rates of returns of factors are interrelated and that factor movements themselves are related to trade. The interdependence between the movements of factors depends on whether they are complements to or substitutes for each other. The interdependence of factor movements with trade depends on whether factor movements are a complement to or a substitute for trade.

Factor movements represent a complement to trade if factor flows follow trade and if trade follows factor flows. For instance, an existing or a potential comparative export advantage of a country for a specific good attracts capital, technology and people, i.e. factor flows follow trade. In contrast, trade can also follow migration. For example, after people have migrated, their consumption pattern in the immigration country may continue to include goods of their previous country, leading to imports to their new country of residence. Or foreign capital invested in a country may increase the country's production and export potential, thus implying an improvement in comparative advantage and an increase in exports. Last but not least, factor movements are complements to each other, for instance if capital flows are followed by the migration of people, i.e. if capital attracted to a country induces labor to follow in order to equip machines and provide services. Normally, such complementarities do not represent a policy concern; they are usually taken care of by market forces.⁶

The more interesting aspect of interdependence from a policy point of view is that trade and factor flows are substitutes and that some types of factor flows are also substitutes among themselves. The starting point for our analysis is that the international division of labor

⁶ Complementarities of factors have been discussed as a policy problem in regional economics when factors being complementary to each other leave a region and when consequently complementarities magnify the decline of a region.

exploits differences in endowment through trade and factor flows. Demand for products is dispersed and the production of a good tends to be concentrated in space, not necessarily in one spatial point alone. Consequently, a large part of arbitrage in space must take the form of trade in goods. The reduction of transportation costs per unit of good exchanged has opened more scope for trade. Factor flows, however, take place when spatial arbitrage is worthwhile for factors of production, for instance when new spaces are opened up for settlement (as the US in the 17th and 18th century) or are unlocked for capital (as China after the Deng Tsiao Ping reforms). Then it pays to move a unit of a factor, for instance capital. With respect to labor, migration costs include psychic costs of giving up the native environment.

The decision on the different forms of interaction can be thought of as a three-stage hierarchical assessment: First, does it pay to move a good? Second, does it pay to move capital and do capital flows make it unprofitable to move goods? Third, does it pay to migrate and does this make it unprofitable to move capital or goods? In this hierarchical decision structure, the third criterion dominates the second, and the second dominates the first. The idea of a hierarchical decision structure is a description of the market process and of the choices of all the market participants.

For the relationship between factors themselves, the interdependence of factors due to the production function is relevant. When factors are substitutes, the factor price frontier indicates which combinations of real factor prices are feasible with a given production function and therefore with a given technology. In a two-factor case with capital and labor, if the price of one factor is given, the maximal possible price of the other factor is determined by the production function (Siebert 2007).

These considerations on the substitutionability of different forms of interaction imply a pecking order between trade and factor flows where the arbitrage of goods has an economic advantage over factor flows. This is consistent with a view that takes the policy goal to keep adjustment costs low for people low into account.

In such a pecking order, trade can be viewed as the prime mechanism of adjustment. It deserves that rank because it reduces the need for the migration of people, raising real income in the country of potential emigration through the expansion of the export sector and through lower costs for import goods. The rates of returns of factors depend on the fact to what extent

such differences in the rates of return can be leveled out by trade flows. In the exchange of goods, outsourcing is an important channel through which exports in other countries are stimulated; employment there is enhanced and wage income is improved. Historically, trade has been the traditional instrument to generate benefits. It has priority over other mechanisms of adjustment.

Capital and technology flows come in as the second mechanism of adjustment. When capital and technology flow to people, the necessity for people of low-income countries to emigrate is reduced. Thus off-shoring, opening new options, plays a similar role as outsourcing with respect to trade. The policy approach is “jobs to the people instead of people to the jobs”.

Migration as a mechanism of adjustment only comes in third. It generates benefits but the migrant is burdened with psychic costs. These costs can be prevented by trade and capital as well as technology flows. This view assumes that the benefits stemming from the forms of adjustment are comparable in a three-stage hierarchical process of market decisions. It requires that migration does not outperform trade and capital flows in generating benefits. Then, migration would be preferable.

A special case in the relationship of trade and migration has been discussed in international economics under the heading of an integrated world market equilibrium. Trade can be viewed to arbitrage away differences in factor endowment in the sense that common product and common relative factor prices are established through goods arbitrage in equilibrium. With given production functions, this may not be possible for all endowments. It is conceivable that endowments of countries are so diverse that factors of production cannot be fully utilized in trade.⁷ Then capital flows or migration are necessary to obtain maximum gains and to arbitrage away endowment differences. The ranking of the three forms of exchange hinges on value judgments. If migration is thought to have a value in itself, for instance in order to mold a multicultural society, the merits of migration cannot be evaluated relative to the other forms of factor movements

The described pecking order of forms of interdependence can also be interpreted as a sequential process going on in time. In a first stage, countries export goods and then in a second stage these exports attract capital and technology. If in such a scenario education is

brought to the people, in a third stage the labor pool attracts additional capital and technology which then represent an further basis for exports. This third stage may also occur simultaneously. In a different scenario, the migration of people in a first stage is followed by the inflow of capital and technology in a second stage which then establishes a basis for exports.

As a consequence of this pecking order, it is recommendable to strengthen the rules for trade since then people do not have to migrate and do not have to incur psychic costs. This corresponds to the strategy “Let them export. Then people can stay”. As a second strategy, it is recommendable to strengthen the rules for capital and technology flows since then also less migration is needed. This corresponds to the strategy to bring capital and technology to the people.

⁷ In technical terms, the endowment point lies outside the parallelogram that defines the possible equilibria (Dixit and Norman 1980).

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