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The Economics of Medical Tourism A Case Study for the USA and India

Marc Piazzolo

Nurşen Albayrak Zanca

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Amerikastr. 1
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WWW: <http://www.fh-kl.de>

Zu den Autoren:

Dr. Marc Piazolo

*Professor of Monetary and International Economics, University of Applied Sciences
Kaiserslautern, Zweibrücken, Germany (marc.piazolo@fh-kl.de)*

Dr. Nursen Albayrak Zanca

*Associate Professor of Economics, University of the Incarnate Word
H-E-B School of Business, San Antonio, Texas, USA (zanca@uiwtx.edu)*

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Index and Abstract

medical tourism, Ricardian model, comparative advantage, international trade, gains from trade

The objective of this paper is to demonstrate a simple Ricardian model of international trade for health care industries of the USA and India. Our motivation is to illustrate that specialization and free trade result in gains from international trade. We will shed some light on the economics of outbound as well as inbound medical tourism. By adopting the model of comparative advantage to the costs of medical surgeries, we will show that trade between our two model countries – India and the USA – is beneficial to both of them. We chose India and the USA due to their prominence in worldwide medical tourism flows, as well as due to the significant difference in per capita income. By specializing on the type of surgery they are most efficient in producing, it will enhance the well being of both nations. Numerical examples and graphical presentations help to support our arguments.

In addition, we will lift some of the more restrictive assumptions. By including transportation costs, barriers of trade as well as a larger variety of surgical services, the central message of the beneficial effect of specialization still remains, even though the general picture becomes slightly blurred. There is evidence for support of a more multi-polar international system of trade in medical services.

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List of Abbreviations

AMA	American Medical Association
bn	billion
CBO	Congressional Budget Office
CIA	Central Intelligence Agency
CPF	Consumption Possibility Frontier
DC	Dental Crowns
DI	Dental Implants
GDP	Gross Domestic Product
HIP	Hip Replacement
HVR	Heart Valve Replacement
ISO	International Organization for Standardization
JCI	Joint Commission International
OECD	Organisation for Economic Co-Operation and Development
PPF	Production Possibility Frontier
PPP	Purchasing Power Parities
PTCA	Percutaneous Transluminal Coronary Angioplasty
UNWTO	World Tourism Organization
USD	US-Dollar

Introduction

With general tourism on the rise (UNWTO 2009), it is estimated that the volume of medical tourists could reach 4 million per annum by 2012 (Deloitte 2008a). Medical tourism has become a major force for the growth of service exports world wide, while concentrating on a selective number of recipient countries – with India and Thailand as major markets. At the same time, medical tourism offers a financial valve for the growing burden of health care costs in mature markets like the USA. In addition, it provides an alternative for the almost 50 million uninsured adults (2010) of the USA in receiving affordable and accessible medical services.¹ Even though the 2010 health care reform will cover 34 million uninsured Americans by 2019,² the driving force of the outbound medical tourism will remain to be costs. For surgical services in South Asia these costs are between 10 to 20 percent of the corresponding ones in the USA (Unti 2009). At the same time, hospitals in developed countries like Belgium, Germany and the USA are trying to attract inbound medical tourists by offering special and high quality services (Vequist / Valdez 2009). General trends in global medical tourism are briefly discussed in section 1.

With the help of the traditional Ricardian model of international trade³, we will shed some light on the economics of outbound as well as inbound medical tourism in section 2. By adopting the basic model of comparative advantage to the costs of medical surgeries, we will show that trade between our two model countries – India and the USA – is beneficial to both of them. We chose India and the USA due to their prominence in worldwide medical tourism flows, as well as due to the significant difference in per capita income.⁴ By specializing on the type of surgery they are most efficient in producing, it will enhance the well being of both nations. Numerical examples and graphical presentations on dental services and medical operations help to support our arguments. In section 3, we will lift some of the more restrictive

¹ CBO 2010; Senate 2006 and Collins et. al 2008. In 2008, 46.3 million Americans representing 15.5% of the population were uninsured (DeNavas-Walt et al. 2009 Table 7).

² Joint estimates of the Congressional Budget Office and the Joint Committee on Taxation on the effects of the US health reform bill (CBO 2010 Table 4).

³ e.g. in Krugman / Wells 2009 or Mankiw 2009.

assumptions. By including transportation costs, barriers of trade as well as a larger variety of surgical services, the central message of the beneficial effect of specialization still remains, even though the general picture becomes slightly blurred. In the final section, we show that there is evidence for support of a more multi-polar international system of trade in medical services.

1. General Trends in Medical Tourism

Historically, patients of developing countries often journeyed from less developed countries to medical centres in more developed countries, where they received services that were not available in their countries of origin - as medical know-how and technology was missing.⁵ As technology and medical know-how dissolved to emerging market countries, a new model of medical tourism – from rich to poor countries – evolved over the last two decades. Rich country tourists started to exploit the possibility to combine tourist aspects with medical ones. Today, one finds modern hospital facilities close to major tourist attractions in countries like India, South Africa, Thailand and Turkey. Hospitals do look more like first class hotels and they actively promote tourist packages with their medical services.⁶ Therefore, medical tourism increases in part with the growth trend of general tourism: worldwide international tourist arrivals grew annually by an average of 4% between 1996 and 2008. Due to the recent recession as well as uncertainties brought about by the influenza outbreak, tourism is estimated to have taken a dip of -4.3% in 2009.⁷ A sluggish economic recovery might dampen the revival of tourism flows at least in the short term. At the same time the recession could lead especially USA insurance companies and employers to re-evaluate how to lower ever rising healthcare costs.⁸ Not only is the US health-care system by far the most expensive in the world – USA health spending

⁴ As most of the research was undertaken at the University of the Incarnate Word in San Antonio, Texas, our perspective is from an US-American angle.

⁵ See Unti (2009) 18. e.g. wealthy individuals travelled abroad to seek spas, mineral baths, innovative therapies in fairer climates in Europe.

⁶ E.g. Thailand: Bumrungrad (www.bumrungrad.com); India: Apollo Hospital in Kolkata (www.apollohospitals.in); South Africa: individual doctors (www.surgeon-and-safari.co.za).

⁷ UNWTO (2010) p. 3. For 2010, an equivalent rebound of 3-4% is expected by the World Tourism Organization.

⁸ Edelheit (2009) p. 2. From 1960-2006, only in six years – four of them during the Clinton boom - did GDP growth actually exceed health care spending growth. In addition, health

runs at 16.2% of GDP, far above the OECD average of 9% (2007), its quality does not compare too well with other OECD countries.⁹ Medical tourism might be one way to improve services while at the same time help to dampen the rise in overall spending on health care. Unfortunately, data on medical tourist flows are poor. Therefore, one has to rely on surveys to estimate the flows as well as the economic might of the medical tourism industry. In 2006, world wide business in medical tourism grossed about \$60 bn. It is expected to rise to \$100 bn by 2012.¹⁰ India, Malaysia, Singapore and Thailand are one of the most attractive medical tourist destinations, already making a significant impact on their economies. In 2005, approximately 500,000 Americans travelled abroad for medical treatment, by 2007 this number rose to 750,000 and it is expected to increase to more than 15 million Americans annually by 2017.¹¹ Though, there are others that are much more cautious about the actual size of the medical tourism market: focusing on the market segment of international *inpatients*, three McKinsey analysts estimated a world market for the 20 most important medical-travel destinations of up to 85,000 patients annually for 2007 only. Besides their focus on patients that are actually staying in a hospital, they also subtracted substantial numbers for emergency cases and expatriates. The latter they did not consider core medical tourists.¹² Even these conservative estimates are still worth looked after, as the growth potential is immense, if certain barriers for medical travel - like non-coverage from the country of origin market's payors – would be lifted.

Let us briefly take a closer look at the major characteristics of international or cross-border medical tourism. When looking at the broader health care tourism industry, we

care cost inflation exceeded core inflation in each and every year over the last 50 years (McKinsey 2008 p. 37).

⁹ e.g. infant mortality or death rate after haemorrhagic strokes (Economist 2008). Also, the USA spends \$7, 300 per person (in Purchasing-Power Parity), more than twice as much as the average of the OECD countries (*OECD Health Data 2009* in: Economist 2009 p. 27). Even when adjusting for its relative wealth, the USA spends a lot more on health care than can be expected (OECD in: Mc Kinsey 2008 p. 36).

¹⁰ McKinsey & Confederation of Indian Industries 2005 in: Herrick (2007) p. 1-2. The \$60 bn (2006) of estimated medical tourism business world wide is less than 8% of total world exports in travel (Hussain / Gori 2009 p. 1).

¹¹ Deloitte Centre for Health Solutions in: Economist (December 22, 2008). Though, these forecasts have to be taken cautiously; they seem to be inflated.

¹² Based on their survey data and interviews, Ehrbeck et al. (2008 p. 2-3) actually filtered core medical travellers down to 35%-45% of all international *inpatients*.

differentiate between *wellness tourism* and *medical tourism*.¹³ The latter can then be further broken down into *cosmetic surgery* and *elective surgery*. Our focus will be on the non-cosmetic surgeries and medical treatments. In the near past patients from less developed countries travelled to major medical centres in industrial countries. There, they looked for sophisticated, often technologically advanced services that were typically not available in their home countries. These patients were usually wealthy individuals. On the reverse you had individuals from rich countries seeking services that were either not covered by their health insurance, there were long waiting periods for specific treatments in their home country or the services were simply not available – often due to legal restrictions like organ transplants or reproductive treatments. The majority of those services were of limited medical complexity.¹⁴

Table 1: Unit Cost for Different Types of Medical Procedures (in USD)

Type of Procedure	USA Hospital [*]	Indian Hospital [*]	Thai Hospital ^{***}
Hip Replacement	\$50,000	\$7,000-\$9,000	\$12,000-\$17,300
Knee Replacement	\$45,000	\$6,000-\$8,000	\$10,700-\$13,200
Heart Bypass	\$100,000	\$6,000-\$9,000	\$22,800-\$34,300
PTCA (Angioplasty)	\$70,000	\$4,000-\$7,500	\$12,200-\$19,800
Spinal Fusion	\$75,000	\$5,000-\$8,000	\$5,500-\$7,000
Breast Augmentation (Cosmetic)	\$9,000	\$3,500-\$5,000 ^{**}	\$2,750
Face & Neck Lift (Cosmetic)	\$11,500	\$2,500-\$4,000 ^{**}	\$3,700

PTCA – Percutaneous Transluminal Coronary Angioplasty

(^{*}) Median costs. Data retrieved from www.indushealth.com (October 18, 2009).

(^{**}) www.medretreat.com (October 18, 2009).

(^{***}) Bumrungrad Hospital, www.bumrungrad.com (December 16, 2009); range of real costs between July 2008 – June 2009; package prices are usually substantially lower.

Today, the focus is more on tourists (patients) from developed countries, who travel to hospitals in emerging market countries seeking sophisticated - state of the art - medical treatments at substantially lower cost. *Table 1* presents typical types of procedures and their US-costs compared to the costs in attractive medical tourist destinations. Treatments in India and Thailand refer to high quality, full service and internationally accredited hospitals with physicians that were predominantly educated at respectable universities in developed countries. These hospitals often seek

¹³ Caballero-Danell / Mugomba (2006) p. 11.

¹⁴ Unti (2009) p. 18-19.

affiliation with a well-known USA or UK teaching hospital to lift standards as well as reputation.¹⁵ The potential cost savings per medical treatment is up to 90% of US-costs.¹⁶ Their cost advantage is based on significantly lower fixed costs, employee wages as well as liability insurance premiums.¹⁷ To offer internationally marketable and competitive services the hospitals have to be accredited by a third party like the Joint Commission International or comply to ISO 9000.¹⁸ Also, hospitals offer package deals for standard procedures, thereby trying to limit the risk for the patient of exploding costs. Since it has become a major industry, several websites of medical tourism agencies and even non-profit organizations inform potential clients and promote international travels by linking the patients to hospitals or individual physicians.¹⁹

¹⁵ Deloitte (2008a) p. 3.

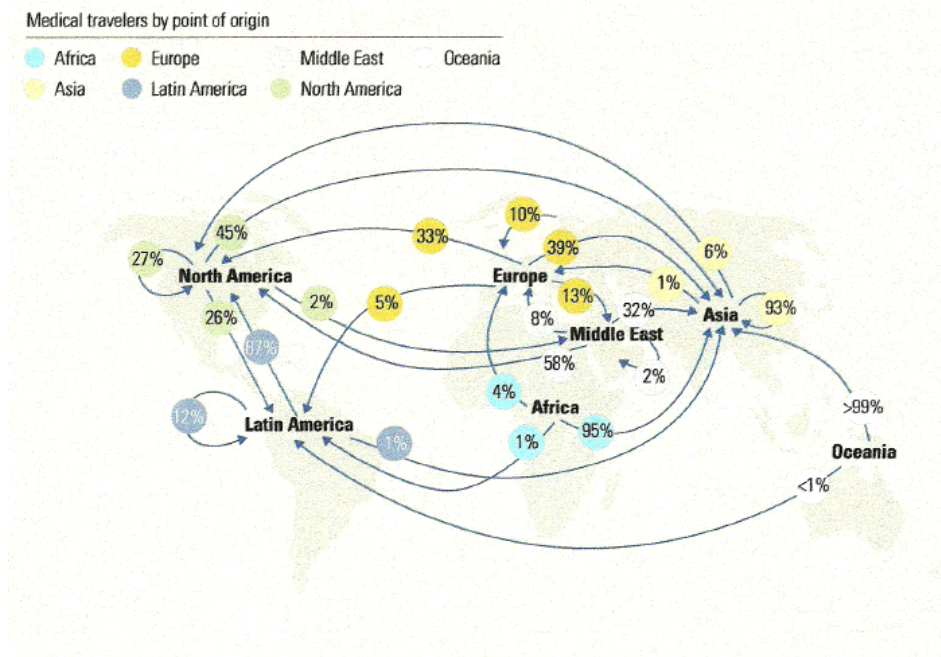
¹⁶ Examples on individual patients can be found on the websites of medical tourism agencies, or e.g. in the Senate Hearing (2006) p. 2-8; Bey (2007) p. 176-177.

¹⁷ Unti (2009) p. 20; see Herrick (2007) p. 9-12 for examples: Indian doctors earn 40% less than USA physicians. Medearis (2010) p. 9 mentions the significance of the proliferation of medical lawsuits driving up the cost of medical liability insurance.

¹⁸ The hospitals mention the accreditation on their own websites. But one can also check the Joint Commission International for a list of their accredited hospitals (www.jointcommissioninternational.org), or the ISO International Standards Organization as well as Health Care Tourism certified hospitals (www.healthcaretrip.org).

¹⁹ The following are major websites of medical tourism agencies: MedRetreat in USA (www.medretreat.com) including two case studies; Healthcare Tourism International (www.healthcaretrip.org) – non-profit organization; Plant Hospitals (www.planethospital.com); IndUShealth Inc. (www.indushealth.com) – specializing on India and USA patients (also Senate 2006 37-4); Health Tourism (www.health-tourism.com) and Treatment Abroad in the UK (www.treatmentabroad.net); Hospital Scout (www.hospitalscout.com).

Figure 1
Globalization of Medical Tourism Flows



Source: Interviews with providers and patient-level data; McKinsey analysis

Ehrbeck et al. (2008) p. 5

Figure 1 shows that the world has become a flatter place – we see an influx and outflow of medical tourists from every continent except for Africa and Oceania. Though, the recent focus in medical tourism has been on *outbound* patient flows – from the developed countries to hospitals in the emerging markets in Asia, Europe and Latin America. The main driving force is the cost advantage, which is regularly mentioned in the recent US health reform debate as being one of the means to keep US health spending from getting out of hand. In 2006, there was already a hearing in the US Senate discussing the question “Can Medical Tourism Reduce Health Care Costs?” The answer sounded like “Yes – but we just don’t know by how much” (Senate 2006). At the same time, USA and European hospitals – especially in the UK as well as in Germany - are able to attract foreign patients for high quality and specialized care.²⁰ These *inbound* medical tourists are usually private patients and therefore, often provide a financially advantageous source of income – USA hospitals

²⁰ Gerl et al. (2009) list some of the specialized medical clusters in Europe – either on different fields of medicine or focused on special groups of medical tourists (e.g. for Arab customers in Bonn, Germany). Also, hospitals in Southern Germany have significant cost advantages compared to their Swiss or UK competitors, thereby attracting approximately 74,000 foreign patients to Germany in 2006 (Juszczak 2007 p. 1, 4, 12)

with dedicated international centres generate up to 10 percent of total revenue from international patients.²¹ So, from a USA or developed country perspective, there are *inbound* as well as *outbound* medical tourism flows. In the next section, we will present a traditional model on international trade – this time in medical services – to shed some light on the economics behind the observed tourism flows.

2. Medical Services and a Traditional Ricardian Model of International Trade

The concept of comparative advantage and gains from trade are one of the oldest ideas in economics (Buchholz 1989). The principles of comparative advantage was introduced by David Ricardo in his 1817 book ‘On the Principles of Political Economy and Taxation’, the theory showed how nations benefit from free trade. Within the economics literature the improvement in national welfare is known as the gains from trade. Ricardo (1817) argued that access to foreign markets is crucial in specialization and wealth creation. Ricardo used a simple model to show how nations maximize their material welfare by specializing in goods and services that they have the lowest relative costs of production. In this section we will demonstrate some empirical evidence for principle of comparative advantage, specialization and wealth creation concepts for medical tourism sectors in India and the USA.

Table 2 summarizes the data on costs of production for dental services in India and the USA. The USA has *absolute disadvantages* in both Dental Implants (DI) and Dental Crowns (DC), measured by larger costs of production. Assuming that the dental services are homogenous in quality - can trade bring net national gains to both counties? In addition, we assume that there are only two countries, no economies of scale, only two kinds of medical services, no transportation costs and no barriers to trade. Also, it is assumed that there is perfect knowledge, so that all buyers and sellers (patients and hospital management) know where the cheapest goods or the potential patients can be found internationally.

²¹ App. 400,000 international patients contribute \$5 bn annually to the USA economy (Deloitte Center for Health Solutions in: Quesada 2009).

Table 2: Unit Costs for Dental Services in India and the USA

Unit Costs	India (Capacity: 32,000)*	USA (Capacity: 50,000)*
Dental Implants	\$1,780	\$2,780
Dental Crowns	\$400	\$1,000

(*) Number of hospitals in India (3,200) and the USA (5,000 community hospitals) in 2007 - assuming ten medical treatments per hospital and day. Data was retrieved from www.medretreat.com (October 18, 2009).

Based on the number of hospitals in each country, *Table 3* summarises maximum production capacities in medical treatments per hospital and day for India and the USA. For example, India can produce 18 units of DI if it produces no DC, or 80 units of DC if it produces no DI. Similarly, the USA can produce 18 units of DI if it produces no DC, or 50 units of DC if it produces no DI.

Table 3: Maximum Output per Day for India and the USA

Maximum Output per day	India (Capacity: 32,000)*	USA (Capacity: 50,000)*
Dental Implants	32,000 / \$1,780 = 18	50,000 / \$2,780 = 18
Dental Crowns	32,000 / \$400 = 80	50,000 / \$1,000 = 50

(*) Number of hospitals in India (3,200) and the USA (5,000) in 2007 - assuming ten medical treatments per hospital and day. Data was retrieved from www.medretreat.com (October 18, 2009).

Figure 2 illustrates the production possibility frontiers (PPF) for India and the USA. It presents the potential production of DC both India and the USA must forgo to produce DI. The PPF shows the trade-offs a country faces when it chooses its combination of DI and DC. It is a straight line because the Ricardian model assumes that opportunity costs are constant. In other words, we state that the trade-off between DI and DC does not change.

Slope of the PPF = Δ DI output / Δ DC output = opportunity cost of DC

Slope of PPF in (USA) = -0.36 (opportunity cost of DC in the USA)

Slope of PPF in (India) = -0.225 (opportunity cost of DC in India)

If the USA does not trade, it gives up 0.36 units of DC for an additional unit of DI. This trade-off is called the relative price of DC or the opportunity cost of DC. The term relative price follows from the fact that it is not in monetary units, but rather in units of the other good, that is DI. By the same reasoning, 0.225 units of DC is the relative

cost (opportunity cost) of one unit of DI in India. David Ricardo (1817) argued that one country has a comparative advantage in producing a good or a service if the opportunity cost of producing that good or service is less for the one country than for the other country (or countries). The data of *Table 3* indicates that India has a *comparative advantage* in producing DC. At same instance, it means that the USA has a comparative advantage in the production of DI.²²

²² Similar graphical analysis for other commodities like shrimp & computers (Vietnam & USA) or meat & potatoes (Farmer & Rancher) can be found in Krugman / Wells (2009) p. 198-200 or Mankiw (2009) p. 51-53.

Figure 2
Production Possibilities Frontier for India and the USA

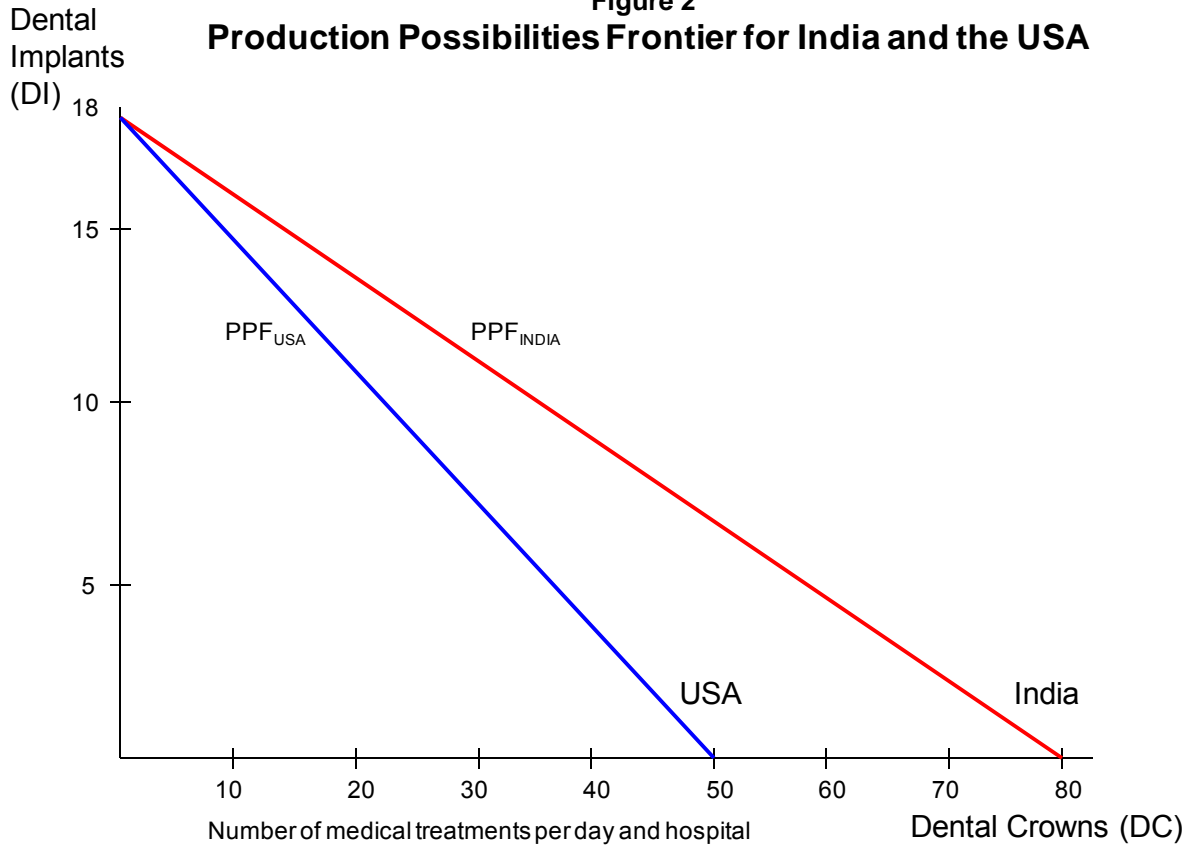
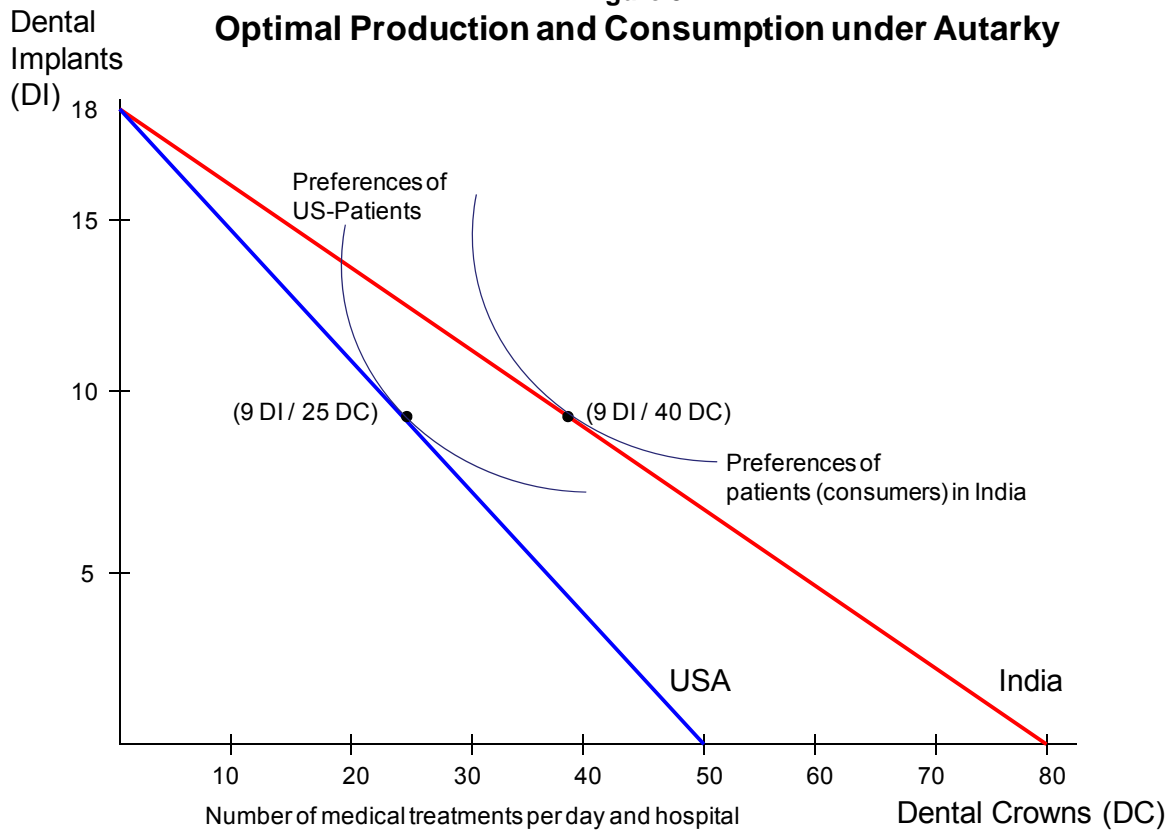


Figure 3
Optimal Production and Consumption under Autarky



PPF – Production Possibility Frontier

The complete absence of trade is called *autarky*, and in this situation, both India and the USA are limited in their consumption to the goods that they produce at home. Suppose autarky prevails, we have assumed both countries divide their respective production capacities equally between DI and DC production. The autarky production and consumption points for India and the USA are shown in *Figure 3*. We assume that in autarky, India would choose to produce and consume nine units of DI and 40 units of DC. *Table 4* summarises total output of DI and DC for India and the USA under autarky. The total outcome in autarky is summarized in *Table 4*, where the world production and consumption is the sum of India and the USA production and consumption, 18 DI and 65 DC, respectively.

Table 4: Optimal Production and Consumption under Autarky for India and the USA

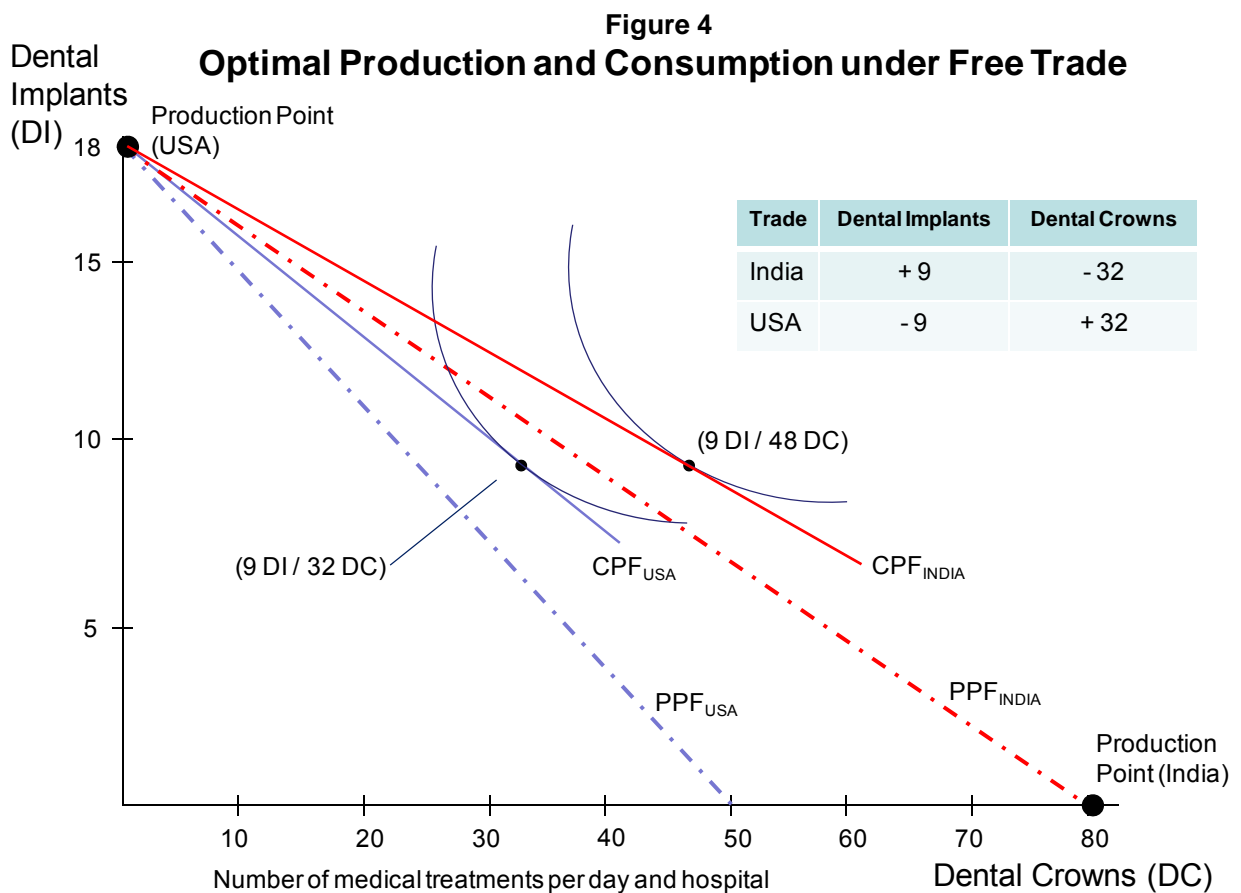
	India (Capacity: 32,000)	USA (Capacity: 50,000)	Total Medical Treatments
Dental Implants	$16,000 / \$1,780 = 9$	$25,000 / \$2,780 = 9$	18
Dental Crowns	$16,000 / \$400 = 40$	$25,000 / \$1,000 = 25$	65

Table 5 illustrates how both countries gain from specialization and *free trade*. As a result of comparative advantage and international trade, the USA produces 18 units of DI, but no DC, and India produces 80 units of DC, but no DI. By comparing *Table 5* with *Table 4*, it is evident that specialization promotes wealth creation measured by increase in total world production. In the absence of specialization and trade (*Table 4*), total world production consists of 18 units of DI and 65 units of DC. After specialization and trade, total world production stands at 18 units of DI and 80 units of DC.

Table 5: Gain from Specialization and Free Trade for India and the USA

	India (Capacity: 32,000)	USA (Capacity: 50,000)	Total Medical Treatments
Dental Implants	0	$50,000 / \$2,780 = 18$	18
Dental Crowns	$32,000 / \$400 = 80$	0	80

Figure 4 summarizes the graphical representation of comparative advantage, specialization, free trade and wealth creation concepts for selected dental services (DI and DC) for India as well as for the USA. Consumers in both countries are strictly better off under *free trade* than under *autarky*. As hospitals in both countries specialize, a number of Indian medical tourist (nine per day) go to the USA for Dental Implants (*inbound tourism*), at the same time 32 American patients seek Dental Crown treatments in Indian hospitals (*outbound tourism*).



CPF – Consumption Possibility Frontier; PPF – Production Possibility Frontier

In the second part of our basic model section, we focus on two common, but more expensive medical services or elective surgeries – Hip Replacement (HIP) and Heart Valve Replacement (HVR). American patients can save up to 80%-90% of the respective US-costs, when undertaking these procedures in an internationally accredited hospital in India. Instead of looking at the hospital capacities of the United States and India as the determinant for the production possibilities of medical services, we assume an arbitrary fixed amount of \$750,000/week & hospital to be

spent in both countries on these two types of procedures. All other assumptions of our first model on dental services still hold, e.g. no transportation costs and homogeneous services.

Table 6: Typical Costs and Output per Week & Hospital in India and the USA

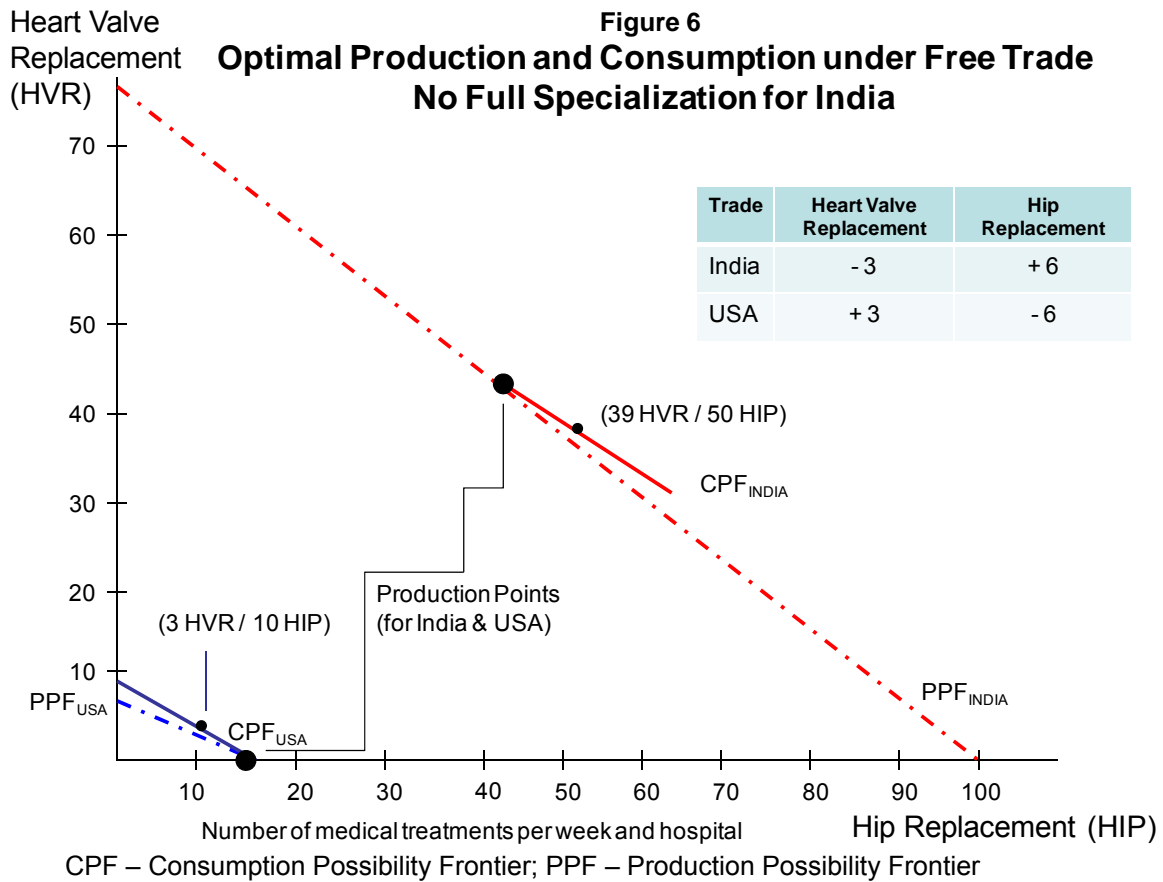
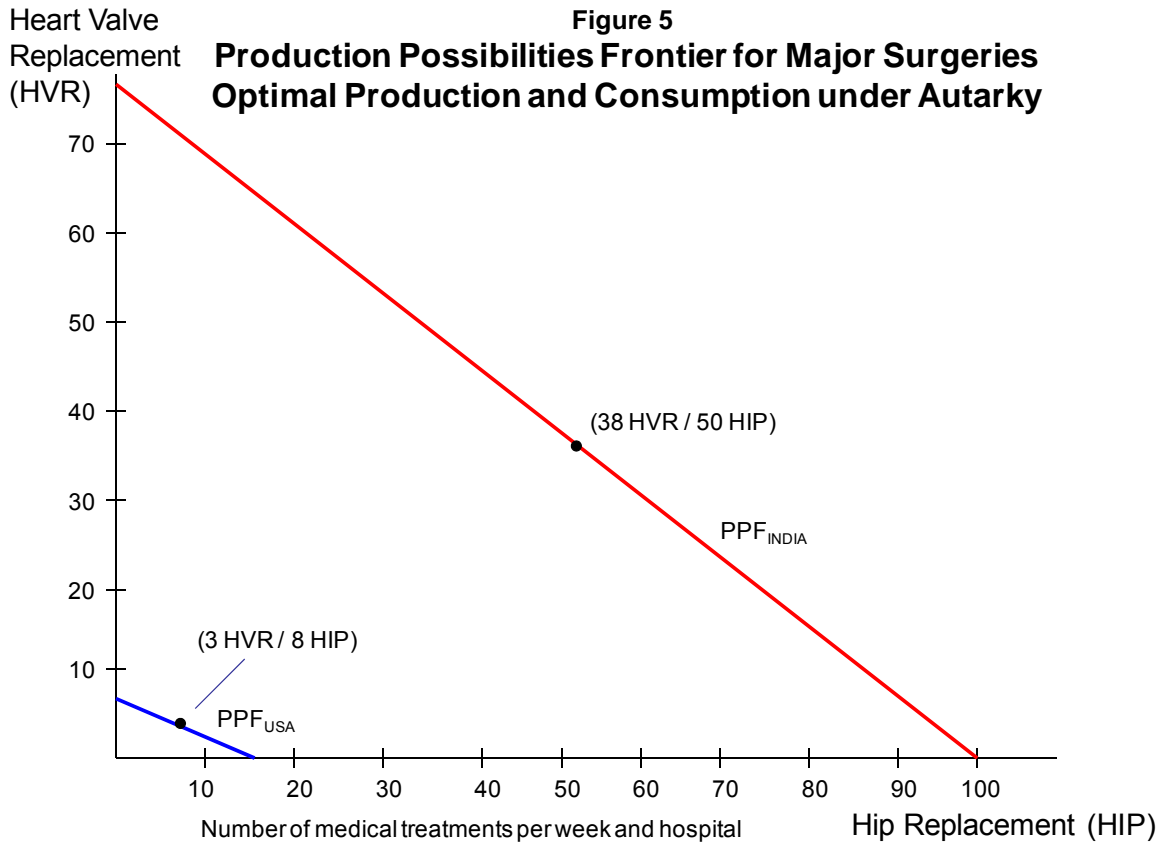
	<i>Typical Cost (per surgery)</i>		<i>Maximum Output (per week & hospital)</i>	
	India*	USA*	India**	USA**
Hip Replacement	\$7,500	\$46,875	100	16
Heart Valve Replacement	\$9,870	\$125,000	76	6

(*) Typical Indian hospital cost and app. median USA cost.

(**) Total spending on surgeries is assumed to be \$750,000 per week & hospital.

Data was retrieved from www.indushealth.com (October 18, 2009).

In *Table 6*, the maximum output levels (per week & hospital) are presented. Due to the substantially higher US-costs the output levels of US-hospitals are far below the ones in India. This is also reflected in the different production possibility frontiers (PPF) of the two countries in *Figure 5*. Hospitals in India have got *absolute advantages* in the production of hip as well as of Heart Valve Replacements. While the US-hospitals hold on to a *comparative advantage* in the production of Hip Replacements as the USA ratio of HIP / HVR is 2.7. This is higher than the one for the hospitals in India (HIP / HVR of 1.3). At the same time India has a *comparative advantage* in the production of Heart Valve Replacements.



Under *autarky*, we assume that due to the respective preferences of patients in both countries, the same amount of financial resources is allocated to each of the two types of procedures. Therefore, the American consumers will purchase and the US-hospitals will produce three Heart Valve & eight Hip Replacements per week. In India this stands at 38 HVR and 50 HIP per week (*Figure 5*). The moment we allow for medical tourism flows between India and the USA, the points of production move towards the production of services that each country has a comparative advantage in. Under *free trade*, the US-hospitals will fully specialize in the production of Hip replacements. While the hospitals in India shift their production only slightly towards Heart Valve Replacement – instead of producing 38 HVR under autarky, they now service 42 patients per week (*Figure 6*).

Why do we not see full specialization in India like we did in our previous example on dental services? Well, we want to show strict gains from international trade in services. Based on the preferences of patients in both countries, this means that the joint free trade output has to exceed the total aggregate output for both medical procedures under autarky. Due to the vast difference in the production possibility frontiers of the USA and India, full specialization is not feasible for hospitals in India. At the same time, this also implicates a substantially smaller gain from trade – the fruits of specialization are not fully in reach. Though, free trade is still worth while pursuing as joint weekly output per hospital increases by two Hip replacements and one Heart Valve Replacement (*Table 7*). In *Figure 6*, the consumption possibility frontier (CPF) for both countries shifts outward slightly.

Table 7: Gains from Specialization and Free Trade for India and the USA

	India [*]	USA [*]	Joint Free Trade Output (Total Autarky Output)
Hip Replacement	\$335,460 / \$7,500 44 (44.7)	\$750,000 / \$46,875 16	60 (58)
Heart Valve Replacement	\$414,540 / \$9,870 42	0	42 (41)

^(*)Total spending on surgeries is assumed to be \$750,000 per week & hospital.
Data was retrieved from www.indushealth.com (October 18, 2009).

Our numerical model implicates that three Americans will travel for HVR to India, while six Indian patients will fly the opposite direction to be treated in US-hospitals for HIP. This outcome results in *outbound* as well as *inbound* medical tourism, just like *Figure 1* based on the empirical McKinsey survey shows.²³ The number of medical tourists is moderate – less than 9% of all patients treated in both countries, but not insignificant. In the following section, we will apply some extension to this basic HIP-HVR model of international trade.

3. Extensions to the International Trade Model with Medical Services

Up until now, we have applied the traditional Ricardian type trade model on the trade of specific medical services (elective surgeries). The flaws of our basic HIP-HVR model are its relatively rigorous assumptions: two country world, only two homogeneous services, no barriers of trade, no transportation costs, only one factor of production and the way we determined the production capacity of hospitals as well as the preferences of patients (consumers) for each country. What effect does the lifting of some of those assumptions have on the implications of our model? Due to the limited amount of room in this paper, we will concentrate on transportation costs, which are quite substantial. For Americans seeking treatment in India, one has to add another \$2,000-\$6,000 in travel costs.²⁴ *Table 8* shows the combined travel & treatment costs for Hip and Heart Valve Replacement. Compared to our basic model, the costs of hospitals in India have increased by 44% for HIP and 36% for HVR.²⁵ In addition, for major surgeries, patients might need an assistance or family member to accompany them – these costs are still not accounted for.²⁶

²³ Ehrbeck et al. (2008) p. 5.

²⁴ Data for travel costs for major types of procedures were retrieved from IndUSHealth (www.indushealth.com/pricing October 18, 2009).

²⁵ As the travel costs for Indians to the USA are relatively minor in relation to the costs for the procedures in American hospitals, we did not take them into account. For our numerical example, they would not have made a difference.

²⁶ In addition, risks due to postoperative complications, which might be enhanced by immobility and long flight travel, have to be taken into account on an individual patients' base (Unti 2009 p. 24).

Table 8: Gains from Specialization and Free Trade for India and the USA – Including Travel Costs?

	India (Autarky)	USA (Autarky)	Joint Free Trade Output (Total Autarky Output)
Hip Replacement	\$334,910 / \$10,800 31 (38)	\$750,000 / \$46,875 16 (8)	47 (46)
Heart Valve Replacement	\$415,090 / \$13,390 31 (28)	0 (3)	31 (31)

⁽¹⁾Total spending on surgeries is assumed to be \$750,000 per week & hospital.
Data was retrieved from www.indushealth.com (October 18, 2009).

Due to the rise in production costs in India, graphically it's PPF shifts inward as the number of medical services hospitals in India can offer internationally drop substantially for both HIP (69 vs. 100) and HVR (56 vs. 76). The comparative advantage for each of the country's hospitals remains the same. The gain from specialization drops to one additional hip replacement under *free trade*. This is not enough of an incentive to induce medical tourism flows. Therefore, if travel costs and other additional costs – like special insurance premiums - are substantial, taking them into account will reduce *inbound* as well as *outbound* tourism, as the gains from specialization vanish. In our numerical example trade in medical services comes to a complete halt.

On the other hand, our assumptions for determining the production capacities in India and the USA were most probably too strict. As the USA per capita income (\$46,000 in 2009) by far exceeds the one of India (\$3,100),²⁷ USA consumers are likely to spend more on medical services than their Indian counterparts. So, one would have to adjust the financial budgets set aside for the types of procedures of interest. In addition, the demand for Hip and Heart Valve Replacement is likely to differ for each country. Making these suggested changes in our assumptions will most likely lead to the revival of the gains of trade in medical services.²⁸ Future research could focus on

²⁷ In PPP-U.S.-Dollar; estimates by the US Central Intelligence Agency (CIA 2010).

²⁸ Even when relaxing some of the restrictive assumptions, a weaker Ricardian model of trade will still show the beneficial sides of free trade (Deardorff 2005 p. 23).

these issues to make our theoretical model ever more realistic. Increasing the variety of medical services could also lead to a more multi-polar world – with various countries specializing on the medical treatments they have a comparative advantage in.

4. Implications of International Trade in Medical Services

By adapting the traditional Ricardian model of international trade (in goods) to different kinds of medical services, we were able to show some of the theoretical backgrounds for the rise in world wide medical tourism. The basic numerical and graphical presentations supported the drive for *inbound* as well as *outbound* patient flows – as it is currently reflected in reality (see *Figure 1*). In addition, free trade in services enhances the economic wealth of open societies or countries. Though, when one takes into account substantial transportation (travel) costs, the problem of liability insurance as well as the reluctance of US insurance companies to cover these lower medical costs of hospitals in foreign countries, the drive towards specialization in medical services is slowed down. In addition, potential savings should amount to more than \$10,000 or procedures in the USA should be above \$6,000 before it is financially advantageous to travel abroad for treatment.²⁹

Due to mounting financial pressure on US companies and the 50 million uninsured Americans (2010), the growth prospect for future *outbound* medical tourism does look promising. Even though the 2010 health care reform will eventually draw up to 2/3 of the uninsured into the system, the cost reduction measurements have not gone far enough (Medearis 2010). Health care inflation still remains unsustainable. Medical tourism offers one step towards significant cost reductions. At the same time, a large part of US consumers seem to be willing to travel abroad. Their willingness increases with the rise of financial savings through foreign versus domestic medical services.³⁰

²⁹ www.medretreat.com/procedures/pricing.html (October 18, 2009). The \$10,000 threshold is especially important for USA uninsured (Ehrlich et al. 2007 p. 6-7).

³⁰ While 3% of all USA consumers have already travelled abroad for medical services, 40% of all surveyed would consider an “elective procedure performed in a foreign country if they could save 50% or more and be assured that the quality was equal to or better than what they can have in the U.S.” (Deloitte 2008b p. 13).

Several US health plans have begun to cover surgeries in Thailand and Mexico³¹ - banking on reducing health costs – thereby further supporting *outbound* tourism.

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³¹ AMA (2007) p.7.

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