

Cho, Seo-Young

**Working Paper**

## Modeling for Determinants of Human Trafficking

Economics of Security Working Paper, No. 70

**Provided in Cooperation with:**

German Institute for Economic Research (DIW Berlin)

*Suggested Citation:* Cho, Seo-Young (2012) : Modeling for Determinants of Human Trafficking, Economics of Security Working Paper, No. 70, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/119396>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

Seo-Young Cho

# **Modeling for Determinants of Human Trafficking**

May 2012

Economics of Security Working Paper 70

## Economics of Security Working Paper Series

Correct citation: Cho, S.-Y. (2012). "Modeling for Determinants of Human Trafficking". Economics of Security Working Paper 70, Berlin: Economics of Security.

First published in 2012

© Seo-Young Cho 2012  
ISSN: 1868-0488

For further information, please contact:

Economics of Security, c/o Department of Development and Security, DIW Berlin – German Institute for Economic Research, Mohrenstr. 58, 10117 Berlin, Germany.

Tel: +49 (0)30 89 789-441

Email: [eusecon@diw.de](mailto:eusecon@diw.de)

Website: [www.economics-of-security.eu](http://www.economics-of-security.eu)

# Modeling for Determinants of Human Trafficking

Seo-Young Cho\*

May 2012

## Abstract:

This study aims to identify robust push and pull factors of human trafficking. I test for the robustness of 78 push and 67 pull factors suggested in the literature. By employing an extreme bound analysis, running more than two million regressions with all possible combinations of variables for up to 180 countries during the period of 1995-2010, I show that crime prevalence robustly explains human trafficking prevalence both in destination and origin countries. My finding also implies that a low level of gender equality and development may have constraining effects on human trafficking outflows, contrary to expectations. The linkage between migration and human trafficking is less clear, and institutional quality matters more in origin countries than destinations.

Keywords: Human trafficking; push and pull factors; robustness; extreme bound analysis

JEL: F22; J16; J61; O15

## Acknowledgement:

The author cordially acknowledges the generous funding provided by the European Commission (JLS/2009/ISEC/AG/005). The author thanks the participants of the Workshop on Human Trafficking, International Crime, and National Security: A Human Rights Perspective (February 3<sup>rd</sup>- 4<sup>th</sup>, 2012, Goettingen, Germany) for excellent feedbacks and discussions.

---

\* Department of Development and Security, German Institute for Economic Research – DIW Berlin, Mohrenstrasse 58, 10117 Berlin, Germany, Telephone: +49 (0)30 89 789 307, Fax: +49 (0)30 89 789 108, Email: [scho@diw.de](mailto:scho@diw.de)

## 1. Introduction

Human trafficking is an emerging problem being caused by globalization processes facilitating human movements. At the same time, the phenomenon is also an old problem dating back to slavery trade practiced in many parts of the world for hundreds of years. Today, income disparity between the affluent North and (relatively) impoverished South is still considerable, if not increasing, and people's aspirations to seek better opportunities have become greater as information on life in other parts of the world is now more available than before due to the development of the mass media and internet. Economic motivation explains, to a great extent, ever-increasing migration: both legal and illegal forms. Also, human trafficking can be explained by the economic motivation of potential victims, as most human trafficking victims are initially migrants.

However, an important question, as far as the causes of human trafficking are concerned, is still to be answered. Why do some people attempting to migrate elsewhere fall victim to human trafficking, while others do not? Furthermore, why is this phenomenon increasing? Although the magnitude of human trafficking is unknown as it is a clandestine activity, Interpol (2009) estimates that it is the third largest transnational crime after arms and drug trafficking. As the phenomenon of human trafficking has become more noticeable and therefore receives greater media attention, efforts to investigate the nature and size of the problem have recently emerged, both in the literature and policy arenas. However, much of the discussions to present rely on the fragmented information available as the magnitude and nature of the problem is very difficult to gauge, if not impossible, given that human trafficking is a hidden, criminal activity of a complex nature (Harrendorf et al. 2010). Thus, the outcome of the investigations is inconclusive and there is little consensus on the prime factors determining human trafficking.

In this paper, I review a comprehensive list of the literature on human trafficking and empirically assess the robustness of human trafficking factors suggested in the literature. My investigation aims to single out robust factors, while controlling for many other overlapping factors. To do so, I make a use of the three global measurements on human trafficking in-/outflows – UNODC (2006), US (2009), and ILO (2005) – datasets for my empirical analysis. To the best of my knowledge, they are the only available indicators of the size of human trafficking at the global level to date. By utilizing and comparing the results of the different measurements, potential estimation biases caused by measurement errors and selection biases – which are common problems in empirical studies on human trafficking – are reduced here.

From the literature consisting of 18 major empirical studies systematically analyzing causes of human trafficking, I gather 78 factors pushing victims to be trafficked from origin countries, and 67 factors pulling victims trafficked into destination countries. The factors reflect diverse aspects of push and pull factors of human trafficking, but can be categorized into four frames. The four prime pillars – migration, crime, vulnerability, and policy and institutional efforts – explain: 1) why certain groups of people take risky migration options and therefore may fall victim to human trafficking (migration and vulnerability pillars); 2) and how/under which environments those migrants are more easily trafficked (crime and policy/institutional efforts pillars). I will present different push and pull factors associated with the four pillars in more detail in section 2.

In fact, it is a challenging task to distinguish between robust factors with statistical significance while controlling for many other factors with overlapping effects, in particular because there are no established findings in the human trafficking literature. In order to check for the robustness of the suggested factors in the literature, I employ an extreme bound analysis (EBA), proposed by Leamer (1983), Levine and Renelt (1992), and Sala-i-Martin (1997). The advantage of this approach is that it identifies factors robust to the choice of other control variables, singling out variables which survive in some million regressions, with all possible combinations of other control variables. This method is particularly sensible if there is no consensus on the choice of explanatory variables in the literature (Gassebner et al. 2012), which is the case in human trafficking research.

My findings show that the crime aspect of human trafficking is a robust factor pushing and pulling victims in origins and destinations, respectively, while the linkage between migration and human trafficking is less clear. In origin countries, institutional and policy quality matters, but the factors of this pillar do not turn out to have a significant impact in destinations. Interestingly, gender discrimination and development, indicators of the vulnerability of people to trafficking, do not demonstrate robust effects and some indicators – high fertility and mortality rates – have constraining effects that are contrary to expectations. It seems that gender discrimination and development do not have a straightforward relation with human trafficking, i.e., very low levels of gender equality and development also constrain human trafficking, possibly by discouraging human (female) mobility.

My study does not attempt to estimate precise marginal effects of each factor, given the fact that the currently available measurements of human trafficking do not precisely reflect the true magnitude of the problem. My investigation instead aims to suggest a set of

push and pull factors robustly explaining human trafficking, regardless of choices of control variables and selection of different human trafficking measurements. Such a baseline set of robust factors provides a reference for further studies closely looking into the specific circumstances surrounding human trafficking, and offers policy relevance in terms of suggesting where to focus on in order to combat human trafficking.

This paper is organized as follows. In section 2, I discuss the four pillars explaining the causes of human trafficking. Section 3 details data measuring human trafficking, which are used in this paper. In section 4, I present the estimation methodology, the EBA. Section 5 shows the empirical results, followed by discussions on the findings in section 6. Section 7 concludes with policy implications and suggestions for further studies.

## 2. Push and Pull Factors of Human Trafficking

The literature puts forward a large set of push and pull factors of human trafficking, the first determining the supply of victims from countries of origin, and the latter determining the demand for labor provided by victims in destinations. The following four pillars provide a tool to explain the different aspects of human trafficking in origin and destination countries. Each pillar is, of course, not exclusive and many push and pull factors can be included in more than one pillar.

### 1) Migration

IOM CTM (2010), a survey of about 10,000 victims, shows that most of victims were initially recruited for migration through personal connections or professional agencies, with less than 5% in the sample of the survey being kidnapped. This observation indicates that, from the outset, the majority of trafficking victims voluntarily decide to migrate elsewhere. In the literature, Mahmoud and Trebesch (2010) suggest that having a migrant in a family tends to motivate other family members to migrate and increases the probability of human trafficking in the family. Akee et al. (2010(a), (b)) also show that migration between two countries induces human trafficking flows between the countries. Friebe and Guriev (2005) and Auriol and Mesnard (2010) theoretically connect the linkage between migration policy and the prevalence of human trafficking in a country.

One of the major reasons for migration is to seek a better life elsewhere. Thus, migration decisions are primarily shaped by economic reasons such as income levels, income disparity between countries, and employment opportunities (Bales 1999). This economic

motivation of migrants is shared by victims of human trafficking who initially wanted to migrate for economic betterment (IOM 2010). Additionally, some other factors facilitating migration and human flows can also provide a linkage to human trafficking flows, such as: information availability about migration options and other countries via media and personal contacts; transportation availability via technological development; the migration policy of a destination/origin country, and certain country characteristics pulling human flows (e.g., geographic locations and common languages). Furthermore, employment opportunities for the low-skilled in origin countries and demand for cheap labor in destinations can shape certain migration patterns more prone to human trafficking, which I will discuss in the section below.

## 2) Vulnerability

Above, I address the linkage between migration and human trafficking because most trafficking victims are initially migration seekers. Thus, it is reasonable to expect that migration flows can provide at least a rudimentary indicator of human trafficking flows; thus, determinants of migration are overlapped with push and pull factors of human trafficking to some extent. However, the pool of migrants is not identical to the pool of human trafficking victims and therefore one needs to raise a further question in explaining human trafficking: why some migrants fall victim to human trafficking, while others do not. In other words, what makes some migrants more vulnerable to human trafficking? In tackling this question, a vulnerability assessment is noteworthy (Akee et al. 2012).

The literature widely points out that the vulnerable position of women in society is a powerful push factor of human trafficking outflows (Danailova-Trainor and Belser 2006; Di Tommaso et al. 2009; Bettio and Nandi 2010; Clawson and Layne 2007). Human trafficking is apparently gender-based violence, the majority of victims being females exploited in the sex industry (UNODC 2006; IOM 2010). Thus, gender discrimination against women in employment is likely a factor pushing women to take risky migration options which can turn in to human trafficking.

On the other hand, the status of women may have a different impact in destination countries. The prostitution business is a common destiny for trafficking victims, with high levels of education and employment opportunities for women in destination countries tending to encourage domestic women to find a job outside of prostitution. When domestic women fade out of the prostitution industry, foreign prostitution may substitute such a shortage of supply, as long as the size of prostitution market remains the same (Cho et al. 2012). With this



in mind, gender equality may have a contentious effect on human trafficking in destination countries (Cho 2011).

There are also other factors making people more vulnerable to human trafficking. As discussed above, income is both a push and pull factor of human trafficking. However, it might be perceived that income differences actually motivate people to undertake risky migration because such a difference can make people resentful towards their current situation, and raise expectations for a better life. In this regard, income inequality can be a strong factor pushing underprivileged people to be trafficked (Mo 2011; Jac-Kucharski 2011). Also, conflicts, human rights violations and socioeconomic/political unrest lead people into desperately wanting to escape from their current living situation, therefore making people under such circumstances more vulnerable to human trafficking (Akee et al. 2010(b); Frank 2011, Koser 2000). Additionally, employment structures in origin and destination countries determine the vulnerability of migrants towards human trafficking in different ways. Better employment opportunities for unskilled workers (such as employment in agriculture) can constrain human trafficking outflows, given that most vulnerable migrants are unskilled workers (Clawson and Layne 2007), while large demand in the prostitution, agriculture and other informal sectors in destinations pull more vulnerable migrants into their countries, increasing the likelihood of being trafficked (Cho et al. 2012); Jakobsson and Kotsadam 2011; Danailova-Trainor and Belser 2006).

### 3) Crime

While human trafficking reflects an illicit, exploitative pattern of migration, it is, at the same time, a crime – specifically a transnational crime – involving the illegal transportation of people for the purpose of exploitation (UN 2000). According to Interpol (2009), human trafficking is the third largest transnational crime, bringing large profits for organized crime groups. Much of the criminology literature documents the connection between human smuggling, human trafficking and organized crime activities (Aronowitz 2001; Salt 2000; Schloenhardt 2001). The studies show that organized crime organizations – which are already involved in human smuggling and drug/arms trafficking – are now expanding their business into trading victims of human trafficking for exploitative labor. These studies point out that such involvement of criminal organizations enlarges the scope of human trafficking business, with the profits made through such business amounting to some billion dollars every year (Belser 2005). In quantitative empirical studies, Akee et al. (2010(a)) pioneer a study on

traffickers' incentives to operate human trafficking business in different countries. Their study suggests that the level of law enforcement and corruption, as well as the prostitution regime, can affect traffickers' incentives in selecting countries for their criminal operations.

Based on the discussions in the literature, the prevalence of the crime of human trafficking seems to be determined by profitability, which is related to market and employment conditions in which trafficking victims are typically employed (e.g., prostitution, domestic servitude, agriculture and other informal sectors), the risk of being caught (law enforcement level), and the presence of already existent criminal organizations with respect to operation costs and knowledge of trafficking operations. However, the crime aspect of human trafficking is something which has widely been neglected in the empirical literature and thus linkages between human trafficking and the prevalence of crime are still empirically inconclusive.

#### 4) Policy and institutional efforts

As human trafficking is a crime, institutional efforts in combating the crime play an important role in explaining the prevalence of human trafficking. Much literature discusses law enforcement and the level of corruption as important factors, both in origin and destination countries (Akee et al. 2010(a), (b); Cho et al. 2011, 2012; Jakobsson and Kotsadam 2011). Besides the general rule of law, specific anti-trafficking measures are also crucial to addressing the problem (Cho et al. 2011; Lloyd et al. 2012; Potrafke 2011; van Dijk and Mierlo 2011). The anti-trafficking measures are namely prosecution policy punishing traffickers, protection policy for victims, and prevention policy controlling borders and tackling the causes of human trafficking (UN 2000). These measures are essential in addressing human trafficking problems as human trafficking is a specific form of crime which cannot be fully covered by other existing laws. At present, as anti-trafficking is a relatively new policy area, the policy responses tend to reflect the severity of the problem a country faces (van Dijk and Mierlo 2011), with the true effects of anti-trafficking policies in reducing human trafficking only to emerge in the future.

On the other hand, some recent studies suggest that women's political representation can influence anti-trafficking measures given that most victims are women and, therefore, female politicians may have more concerns about combating the problem (Bartilow 2010; Jac-Kucharski 2011). Furthermore, there is a need to address policy efforts tackling the root causes of human trafficking such as poverty, inequality and gender discrimination, as well as

general development agendas, as human trafficking is also a developmental problem bringing about risks for human security (Potrafke 2011).

### 3. Data: Measuring Human Trafficking

One of the challenges of investigating human trafficking is the lack of reliable data (Kangaspunta 2003). As human trafficking is a clandestine, illicit criminal activity, the true magnitude of the problem is unknown (Tyldum and Brunovskis 2005). Furthermore, despite the international definition of human trafficking adopted by the United Nations' Anti-trafficking Protocol (2000)<sup>1</sup>, in reality it is hard to clearly distinguish this phenomenon from illegal migration and forced labor, with many countries using different variations of the definition (for instance, including sex trafficking only, or using the 'forced labor' concept). In fact, at present, there is no internationally comparable official statistics capturing the magnitude of human trafficking (van Dijk 2008). The United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems (UNCTS) provide police statistics on the reported number of human trafficking cases for the period of 2005-2008, covering a maximum of 80 countries. However, these statistics hardly reflect the true extent of the problem, with variations in statistics across countries and time instead capturing the level of law enforcement and differences in the definition of human trafficking between countries (Harrendorf et al. 2010)<sup>2</sup>.

Despite the problems mentioned above, there are several international attempts to quantify the level of human trafficking by utilizing various sources, including media reports, expert judgment and qualitative information from fieldwork. Among them, four datasets provide quantitative information on the magnitude of human trafficking which is comparable across countries. First, the United Nations Office on Drug and Crime (UNODC) proposes an incidence reporting index, grading the level of human trafficking in/outflows on a scale of 0 to 5 based on incidences coded in international reports and media. This index covers up to 161 countries and aggregates numbers over the period of 1996-2003. Second, the United States

---

<sup>1</sup> Convention against Transnational Organized Crime and its Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children (2000). The Protocol provides an internationally recognized definition of human trafficking for the first time, with three important elements: acts of recruiting, transferring and receiving people; by the means of threat, force or deception; and for the purpose of exploitation (see article 3 of the Protocol).

<sup>2</sup> Soares (2004) empirically shows that the UNCTS crime statistics do not reflect the magnitude of crimes, instead indicating law enforcement.

Department of State (2001-2011) categorizes countries into major destinations/origins based on the classification of whether a country experiences more than 100 reported cases of in/outflows in a given year. The US annual data is a dummy variable covering up to 190 countries from 2001 to 2010. Third, the International Labor Organization (ILO) collected information on incidences through its global reporting system and provides the aggregate number of cases during the 1995-2000 period, covering a maximum of 74 countries. Finally, the International Organization for Migration (IOM) offers the Counter Trafficking Module (CTM) data containing more than 100,000 cases in approximately 130 countries. The IOM CTM provides enriched information on the characteristics of victims; however, this dataset is not suitable for a macro-analysis given that it is micro-survey data without a reference to the magnitude of the problem at the country level. Thus, I employ the three macro-level datasets – UNODC, ILO and US – for my analysis.

These selected datasets have several advantages. First, they are gathered by a single collection body under a unified, internationally accepted definition of human trafficking, minimizing noise caused by disparities in collection methods and definitions. Second, as they are not police statistics, these datasets are comparatively less susceptible to biases caused by law enforcement efforts. However, these data are not free from shortcomings. First of all, they are still subject to biases in data collection because they depend on reported incidences. Second, the UNODC and ILO data provide aggregate quantities without variations over time, while the panel data provided by the US Department of State is a dummy variable with few variations. With the constraints of the available data in mind, I employ each of the three datasets in my analysis and compare the results in order to reduce any biases and fragmentation each dataset has. Furthermore, I include control variables capturing as many reporting biases as possible in my estimation model. Detailed information on the three datasets is provided in appendix A.

#### 4. Research Design

The aim of my study is to select robust push and pull factors of human trafficking. In order to pursue this goal, I follow two procedures. First, I review all major existing literature in the field of human trafficking, in particular empirical studies, and collect all factors suggested by these studies. Indeed, empirical studies are rare in this field mainly because of

the lack of data. To the best of my knowledge, to date there are 18 studies<sup>3</sup> empirically investigating the determinants of human trafficking through applying systematic analyses. Through reviewing the currently available studies, I identify 78 (potential) push factors in countries of origin, and 67 (potential) pull factors in countries of destination. The full list of the 18 empirical studies, as well as the push and pull factors suggested in these studies, can be found in appendices B and C.

As shown in the list, there are many different factors suggested by different studies, and their findings do not come to a consensus in regards to the significance of each factor. Some factors are important determinants of human trafficking in some studies, while in others they do not have a significant impact. Such discrepancy is mainly caused by several critical challenges human trafficking researchers currently face. First, as research on human trafficking is still in its infancy, there is no exemplary model identifying the determinants of human trafficking, unlike studies in more established fields such as economic growth, poverty and governance. Thus, the choice of variables for estimation tends to depend on subjective judgments rather than selecting factors which have already been examined in the literature. Given this background, the results of empirical investigations on human trafficking are more likely to be susceptible to the choice of variables. Moreover, difficulties in identifying robust factors are exacerbated due to the poor quality of human trafficking data. As mentioned in section 3, data on human trafficking are fragmented, subject to reporting biases, and are often inadequate for cross-country comparison.

With these challenges in mind, I try to identify robust factors of human trafficking by employing an extreme bound analysis. The extreme bounds analysis (EBA), proposed by Leamer (1983), Levine and Renelt (1992) and Sala-i-Martin (1997), is a method to check the statistical significance of the effect of a factor in all possible specifications, with different combinations of other factors (Gassebner et al. 2012). The main advantage of this method is that it distinguishes factors robust to the choice of other control variables, serving the purpose of my study. In performing the EBA analysis I use the three different human trafficking datasets described in section 3, and compare results in order to minimize any bias each dataset has.

---

<sup>3</sup> Akee et al. (2010(a), (b); 2012), Bales (1999), Belser (2005), Bettio and Nandi (2010), Cho (2011), Cho et al. (2012), Clawson and Layne (2007), Danailova-Trainor and Belser (2006), Di Tommaso et al. (2009), Frank (2011), Hernandez and Rudolph (2011), Jac-Kucharski (2011), Jakobsson and Kotsadam (2011), Mahmoud and Trebesch (2010), Mo (2011), and Zhang et al. (2011).

The following equation is estimated for the EBA analysis.

$$y_i = \delta_C C + \delta_E E + \delta_Z Z + \omega \quad (1)$$

where  $y$  indicates the level of human trafficking in-/outflows, respectively, and vector  $C$  includes ‘commonly accepted’ explanatory variables. In this study, (logged) income is selected as the ‘commonly accepted’ explanatory variable, because most studies examined here unanimously suggest ‘income’ as both a pull and push factor of human trafficking. This variable is therefore always included in every regression. All other variables under investigation, except for ‘income’, enter the vector  $E$  one by one, with each variable being tested while controlling for income and three other control variables in the vector  $Z$ , following Levine and Renelt (1992). The vector  $Z$  contains three control variables in each regression and all variables, except for ‘income’ and the variable currently being examined in  $E$ , enter into  $Z$ . The composition of explanatory variables in  $Z$  changes for each regression, as all possible combinations of control variables are being tested (Gassebner et al. 2012).  $\delta$  denotes the coefficient of the respective variables and  $\omega$  is the idiosyncratic error term.

As the UNODC and ILO data do not have time variations, I conduct a cross-sectional analysis by employing an ordered probit estimation method with the UNODC data, capturing the ordered structure of the dependent variable (score 0-5), and a negative binomial regression method with the ILO data, addressing the nature of the count variable. On the other hand, the US data contains annual variations during the period of 2000-2010, therefore I perform a panel analysis with a probit estimation method as follows.

$$y_{it} = \delta_C C + \delta_E E + \delta_Z Z + \omega \quad (2)$$

Finally, I report each median coefficient and its standard error, the percentage of the regressions (i.e., % sign) in which the coefficient of the variable is statistically different from zero at the 5% level, as well as the proportion of the coefficient’s cumulative distribution function that is greater or less than 0, i.e.,  $CDF(0)$ . Leamer (1983) originally proposed to deem a variable as ‘robust’ if both the lower and upper extreme bounds<sup>4</sup> for the coefficient of the variable in  $E$  have the same sign. However, Sala-i-Martin (1997) argues that this criterion is too strict, insofar that most variables would not survive such extreme bound tests. Instead,

---

<sup>4</sup> The lower extreme bound is defined as the lowest value for the coefficient minus two standard deviations, and the upper extreme bound is defined as the highest value for the coefficient plus two standard deviations (Gassebner et al. 2012)

he recommends a procedure analyzing the entire distribution of the coefficient (for more detailed discussions on this method, see Sala-i-Martin 1997 and Gassebner et al. 2012). Following Sala-i-Martin's recombination, I report CDF(0) and take a CDF(0) value of 0.90 – i.e., significance at the 10% level – as the threshold for a variable to be considered as 'robust'.

To identify push factors in countries of origin, I run more than 0.5 million regressions, while more 0.4 million regressions are run to estimate pull factors in countries of destination. Following these steps, I then compare the robustness of push and pull factors in each of the three estimation models using the UNODC, ILO and US data, respectively. In the following section, I present and discuss push and pull factors found to be robustly significant in the estimation models.

## 5. Findings: Extreme Bound of Push and Pull Factors

In order to identify push factors of human trafficking in countries of origin, I test for the robustness of each of the 78 variables suggested in the literature. Through the first step of employing the UNODC data as the dependent variable, 35 variables are identified as 'robust', with a CDF(0) value of 0.90 or higher. In the second step of checking for robustness by using the ILO and US data, only six of the 35 variables are confirmed to be robust in all of the estimation models. Additionally, eight variables turn out to be robust in two out of the three models (UNODC; ILO; US). Table 1 shows the results regarding these robust variables.

The most robust push factors, which turn out to be significant in all of the three models are: (log)GDP per capita (negative), information flows (positive) – i.e., percentage of internet users, TV, and trade in newspapers; a dummy representing a transitional economy (positive); the size of the food, beverage, and tobacco industries (negative); percentage of Muslims in the total population (negative); and fertility rates (negative).

As expected, poorer countries tend to send more human trafficking victims. The positive impact of information flows is also in line with the migration literature, in that more exposure to outside information tends to encourage people to migrate and therefore increases the pool of potential victims of human trafficking. The increasing effect of a transitional economy seems sensible, given that countries under transition may not provide secure livelihoods for their citizens. The size of the food, beverage, and tobacco industries is associated with demand for low skill labor in a country; having a large industry in this field is likely to create more jobs for people who may have taken dubious migration opportunities,



otherwise. Thus, these industries seem to have a constraining effect on human trafficking outflows. The negative impact of a high Muslim population implies cultural effects discouraging female migration.

An interpretation of the negative sign for fertility rates is tricky, however. One may surmise that high fertility rates are usually associated with overpopulation and underdevelopment, pushing people to pursue risky migration options, therefore making it more likely to be victims of human trafficking. However, the result shows the opposite, indicating that higher fertility rates tend to decrease human trafficking in countries of origin. One possible interpretation is that higher fertility rates are associated with more conservative attitude towards women's role in society, therefore decreasing women's mobility and aspiration for migration. This interpretation is plausible, given that many of the major origin countries are not necessarily the most oppressive countries towards women, and the education level and participation of women is not always low in major origin countries – for instance in Eastern European and several Latin American countries. This controversial finding also reflects a complex relationship between human trafficking and women's rights and overall development. I will discuss this issue in more detail in section 6.

Other factors which are significant in two of the three models are: rule of law (negative); control of corruption (negative); crime rates (positive); stock of FDI as a percentage of GDP (positive); infant mortality rates (negative); the proportion of people under 14 (as a percentage of the total population) (negative); being an Eastern European country (positive); being a Middle East/North African country (negative). The results indicate that countries with poorer institutions tend to push people to move by pursuing risky migration options. Also, the prevalence of crime in general tends to increase the crime of human trafficking.

However, the migration aspect of human trafficking is not straightforward to interpret here. Migration outflows, proxied with net migration and emigration rates of the tertiary educated (percentage of total population who has been through tertiary education), do not turn out to be significant. Also, exchanges of goods and services (trade as a percentage of GDP), which tend to be closely associated with human flows, do not have a significant impact on such illicit, exploitative human transaction. Instead, FDI (as a percentage of GDP) and information flows tend to increase human trafficking outflows. It is probably because foreign



exposure and contacts motivate people to venture to migrate, even if the option is risky. On the other hand, the two available indicators of migration outflows used here may not correctly reflect total migration outflows. Thus, a linkage between migration and human trafficking outflows needs to be further investigated by using more precise measurements once they become available.

The results suggest that socio-economic environments also determine human trafficking outflows. As mentioned earlier, being a transition economy, which is less likely to provide its citizens with a secure life and employment opportunities, increases human trafficking outflows. However, the relationship between the vulnerability of people and the prevalence of human trafficking outflows is less clear. Women's education and employment (or any other gender-related indicators employed here) do not have a significant effect in determining human trafficking outflows. On the other hand, the proportion of people under 14 (as a percentage of the total population) decreases human trafficking outflows, possibly because having many children restrains women's migratory motives, similar to the negative effect of fertility rates. It suggests that women's rights have an intertwined relationship with human trafficking; i.e., gender discrimination does not necessarily increase human trafficking outflows, possibly because oppression against women also constraints women's mobility. Moreover, a negative sign of the coefficient of infant mortality rates – a basic indicator measuring fundamental well-being – implies that an extreme level of underdevelopment may not push people to migrate but rather discourage people from doing so.

In addition to this, economic inequality, measured by the GINI index, does not turn out to have significant impact, although the literature emphasizes inequality as an important cause of human trafficking outflows. However, the CDF(0) lies between 0.85 and 0.88 – marginally insignificant – and this result may have been driven by many missing observations (about one third of observations are missing when including the GINI index in regressions). Thus, one should be cautious in interpreting this implication, with further investigation needed. As mentioned earlier, I will further discuss the complex relationship between gender equality/development and human trafficking in section 6.

Lastly, the results also suggest that geographical locations and cultural practice influence human trafficking outflows. Being an Eastern European country, proximate to affluent Western Europe, increases the probability of the outward prevalence of human

trafficking, while being in the Middle East/North Africa and having a larger Muslim population, decreases the problem.

Turning to pull factors determining human trafficking flows into destination countries, I test for the robustness of 67 potential factors suggested in the literature. In the first step of testing with the UNODC data, 26 variables are identified as ‘robust’ with a CDF(0) value of 0.90 or higher. In the second step of using the ILO and US data, only four factors turn out to be robust in all of the models. They are: (log) GDP per capita (positive); information flows (negative); FDI (positive); and language fraction (positive). Table 2 shows the results of these robust pull factors.

Wealthier countries receive more human trafficking victims, in contrast to origin countries. Interestingly, information flows have a constraining effect in destination countries, opposite to a push effect found in origin countries. It could well be possible that information increases public awareness towards human trafficking problems in destinations, while exposure to information instead motivates people to move elsewhere in origin countries. Similar to origin countries, FDI induces more human trafficking flows into a country, showing that foreign contacts and businesses also bring illicit human movements. More linguistically divided countries tend to induce more human trafficking flows, possibly because having many minorities in a country may create markets for informal, exploitative, and low-paid labor, where victims of human trafficking are typically employed.

Additionally, 10 variables turn out to have significant impact on human trafficking inflows (see table 2): percentage of workforce employed in agriculture (positive); refugee inflows (positive); (log)population size (positive); inflow of international tourists (positive); crime rates (positive); (log)amount of Heroin seized (positive); being an OECD member (positive); being an East Asian country (positive); being a land-locked country (negative); and percentage of Catholics in the total population (negative).

The results show that other types of human flows into countries – measured by refugee and tourist inflows – also increase human trafficking inflows. However, similar to origin countries, the connection between overall migration and human trafficking is unclear, given that the proportion of migrants in the total population has no significant impact.

Interestingly, law enforcement and institutional quality do not play an important role in determining human trafficking flows into destination countries, implying that anti-

trafficking measures are still not well-grounded in general law and enforcement in many countries. On the other hand, the results strongly suggest that the prevalence of human trafficking is closely related to the prevalence of crime in general and organized crime – the latter proxied by the amount of Heroin seized.

Also, the size of the agricultural sector, proxied by the percentage of the workforce employed in agriculture, turns out to increase human trafficking inflows. Given that a considerable portion of trafficking victims is exploited in agricultural fields in destinations, this result indicates that demand for labor in agriculture determines the level of human trafficking inflows. In addition to this, overall population size has a significant, positive effect, showing that larger countries are more likely to receive human trafficking inflows. On the other hand, other developmental indicators such as gender equality, and health and environmental quality measures, do not seem to have any significant impact on human trafficking in destination countries. This is probably because these indicators do not necessarily reflect demand for labor provided by trafficking victims, or profits human traffickers could make via illicit human trade.

As human trafficking is mainly a transnational human transaction between the developing and developed world, belonging to the developed world (OECD membership) increases human trafficking flows into a country. Similar to origin countries, geography and culture also matter in destination countries. Through having a high population density, East Asia tends to receive more human trafficking inflows, while land-locked countries are less likely to have a problem in this case. While the Muslim culture has a constraining effect in origin countries, having a large Catholic population reduces inflows into destination countries.

Finally, I test for the robustness of the findings through two different approaches. First, I re-run the regressions excluding OECD members in order to find out whether the main results are solely driven by developed countries. Second, I apply a regional jackknife method, omitting one continent in each regression, checking whether one specific continent drives all the results. In total, I test seven sub-group samples, running more than one million regressions additionally. The results show that the main findings regarding push and pull factors, are neither driven by any specific continent, nor the developed world alone.

## 6. Discussion

The results described in section 5 imply that a few of the four major pillars of human trafficking proposed in section 2 are robust push and pull factors, while the overall impact of others is not clear. First, the crime aspect of human trafficking is evident both in origin and destination countries, implying that human trafficking is not merely an accompanying phenomenon of human migration, but caused by criminal activities. The institutional and policy aspect plays an important role in origin countries, while this is not the case in destination countries. This result suggests that poor institutions push people towards illicit, risky migration, but different levels of law and enforcement do not necessarily differentiate human trafficking inflows. The reason for this may be that even countries with high general institutional quality may still neglect combating human trafficking problems and the newly adopted anti-trafficking measures still require sometime to create effects. The migration aspect does not seem to directly explain human trafficking in/outflows, but may have an indirect linkage pushing and/or pulling victims via foreign exposure and contact facilitated through human movement. The impact of vulnerability – gender discrimination and underdevelopment here – seems to be controversial, extreme oppression and underdevelopment having constraining effects on (female) human mobility.

The results show that many factors, which are suggested as plausible causes of human trafficking in the literature, are not robust determinants. However, this does not necessarily lead to the conclusion that such factors do not influence human trafficking at all. While the factors found to be robust in my investigation tend to have exclusive explanatory power on the prevalence of human trafficking, other factors may affect human trafficking via indirect linkage or interacting with some other factors. For instance, the prevalence of migration, as such, may not exclusively determine human trafficking in/outflows but may have a significant interaction effect if crime is also prevalent in a country. Also, gender discrimination may have a strong effect in origin countries if migration is a common option for underprivileged people to escape from hardship. Analyzing such effects under certain circumstances is out of the scope of my paper, leaving room for further investigations detailing specific intertwined environments triggering human trafficking.

In this section, I focus on discussing the ambiguous relationship between underdevelopment/gender discrimination and human trafficking in more detail. As both my

results and the existing literature suggest, the level of income is a robust factor pushing and pulling trafficking victims. This finding indicates that victims of human trafficking initially seek migration for economic reasons. This interpretation is supported with the finding that the sizes of the food/beverage/tobacco industries in origin countries and employment in agricultural sectors in destinations – where unskilled workers are typically hired – have a significant impact on human trafficking. However, when one takes a closer look at the list of major origin countries (see appendix D), questions still remain because many origin countries are not necessarily the poorest – particularly those in Eastern Europe and Latin America – and many of the poorest countries – particularly Sub-Saharan Africa – do not seem to be major origin countries. One explanation could be that the current measurements may suffer from underreporting problems in least developed countries because information is less available there. However, another plausible explanation is that income disparity with neighboring countries plays an important role besides the absolute level of income. In particular, as globalization spreads information worldwide, it also tends to increase perceived inequality, motivating people in poorer countries to seek a better life (Mo 2011). To verify this point, a spatial analysis with a regional focus is worthwhile implementing, also calling for a further study on the topic.

An interesting aspect of my findings is the controversial relationship between human trafficking and gender discrimination. Most field studies and surveys on human trafficking victims (IOM 2010; UNODC 2006, 2009; US 2011) estimate that the majority of victims are female, and therefore, human trafficking is a form of gender based violence. However, my empirical results do not confirm gender discrimination as a push/pull factor of human trafficking. Basically, all of the gender-related indicators – female literacy, years of schooling, female labor force participation rates, and indices on women's economic, social, and political rights – do not turn out to be significant in determining either in/outflows of human trafficking. Figure 1 shows very clearly that there is no apparent correlation between human trafficking and gender equality in education and employment. On the other hand, fertility rates and the share of the population under 14 have decreasing effects on human trafficking outflows in origin countries, possibly because having many children may discourage women's mobility, as mentioned earlier. This interpretation is supported by the constraining effects of having a predominantly Muslim population and being a country in the Middle East, which are presumably associated with more conservative attitudes towards women and very low

economic participation. As mentioned in section 2, most human trafficking cases initially start with the voluntary migratory motives of victims. Thus, it is necessary to point out that victimization of females for human trafficking requires that women at least have the autonomy to migrate in the first place. Thus, extreme oppression against women may discourage not only women's mobility, but also human trafficking. However, at the same time, it is important to address the question as to why women are particularly vulnerable to risky migration options, evidenced by the disproportional share of female victims. Here it seems plausible to speculate that women are less privileged in securing quality employment and maintaining their livelihood, and are thus more likely to pursue risky migration paths. It suggests that the causal relationship between gender discrimination and human trafficking may be non-linear – i.e., beyond a certain level of autonomy for women, allowing them to migrate, gender discrimination in education and employment plays a crucial role in pushing victims.

In terms of destination countries, however, it is more difficult to build a convincing hypothesis regarding gender discrimination and human trafficking. Cho (2011) points out that, as the majority of trafficking victims are foreigners, the level of women's rights in a destination country is at best irrelevant, or even deteriorates human trafficking inflows. The reason for such a controversial argument is that victims of trafficking are usually exploited in sex industries or for domestic labor, where women with higher education and opportunities are less likely to work. With this in mind, one can argue that it is the size of prostitution markets, rather than gender equality, which determines human trafficking flows into destination countries. Unfortunately, there is no available measurement of the size of prostitution markets at the global level<sup>5</sup>. One available proxy used in the literature is the legal standing of prostitution, with an assumption that countries with liberal prostitution regime are likely to have larger prostitution markets. In the literature, Jakobsson and Kotsadam (2011) and Cho et al. (2012) empirically show that liberal prostitution law has a positive relationship with human trafficking inflows – the former investigating 37 European countries and the latter investigating upper and middle income countries. My results show that the prostitution law variable is marginally insignificant – CDF(0) between 0.85 and 0.89 – in the global sample but significant for developed countries. Also, excluding East and South Asia, liberal

---

<sup>5</sup> ILO (2005) estimates the number of prostitutes in 40 countries. I do not use this data for my analysis because of two reasons. First, this collection is subject to severe selection bias and second, in the extreme bound analysis with many other variables, inclusion of this data causes non-convergence.

prostitution law turns out to increase human trafficking flows. This result, although less straightforward, suggests that human trafficking inflows in destinations are more to do with prostitution markets than women's rights. Thus, the gender aspect may have indirect effects on human trafficking only via prostitution – here it is worthwhile noting that both liberal and restrictive prostitution regimes claim to protect women's rights (Outshoorn 2005), making the debates more complex.

## 7. Conclusion

In this study, I empirically investigate and discuss robust push and pull factors of human trafficking by exploring a large set of factors suggested in the literature. The empirical results draw a list of factors robust to different measurements, choice of control variables, and estimation methods, mitigating the limitation of fragmented data and omitted variable problems human trafficking research currently faces.

My study provides several policy implications. The finding supporting the crime aspect of human trafficking signals to policy makers that they should not undermine human trafficking as a mere side effect of migration, urging them to adopt criminal justice and crime prevention measures against human trafficking. Also, one genuine contribution of this study is to explore demand aspects of human trafficking, empirically analyzing the impact of agricultural and sex industries on human trafficking inflows.

However, my study does not claim to provide a final conclusion on the determinants of human trafficking. It rather acknowledges that human trafficking is a complex phenomenon, claiming that the relationship between push/pull factors and human trafficking may not be straightforward. In fact, it appears that it could possibly be non-linear and/or interacting with certain environments. This conclusion calls for further studies in many different aspects. In particular, a complex – possibly non-linear – relationship between gender discrimination and human trafficking warrants a closer look. Also, economic inequality across countries and inside a country may have a strong impact on human trafficking, but is not intensively investigated here due to data limitations, leaving space for follow-up studies.

Finally, it is necessary to address several limitations my study encounters. One genuine feature of this study is the utilization of the three available global measurements of human trafficking, reducing estimation biases. However, integrating the three measurements does not completely eliminate biases caused by the fragmented nature of the data. Also, these measurements mainly cover international sex trafficking, possibly undermining labor and



domestic trafficking problems. As reliable global data are not likely to be available in the foreseeable future, further investigations with specific country cases or regional studies, focusing on a certain type of human trafficking in an origin or destination, would be a logical next step in this area of research

## **References**

- Akee, Randall, Arjun Bedi, Arnab K. Basu and Nancy H. Chau. 2010(a). Transnational Trafficking, Law Enforcement and Victim Protection: A Middleman's Perspective. Mimeo, Cornell University.
- Akee, Randall, Arnab K. Basu and Nancy H. Chau and Melanie Khamis. 2010(b). Ethnic Fragmentation, Conflict, Displaced Persons and Human Trafficking: An Empirical Analysis, in Gil S. Epstein, Ira N. Gang (eds.), *Migration and Culture (Frontiers of Economics and Globalization, Volume 8)*, Emerald Group Publishing Limited, pp.691-716.
- Akee, Randall, Arnab K. Basu and Nancy H. Chau and Melanie Khamis, 2012. Vulnerability and Trafficking. Mimeo.
- Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat and Romain Wacziarg. 2003. Fractionalization. *Journal of Economic Growth* 8(2): 155-194.
- Aronowitz, Alexis. 2001. Smuggling and Trafficking in Human Beings: The Phenomenon, The Markets that Drive it and the Organization that Promote it. *European Journal on Criminal Policy and Research* 9: 163-195.
- Auriol, Emmanuelle and Alice Mesnard. 2010. Fighting Human Smuggling: Legalization or Repression?. Presented at the European Development Research Network Conference (Nov. 2010. Paris. France).
- Bales, Kevin, 1999. What Predicts Human Trafficking? paper presented at the International Conference on New Frontiers of Crime: Trafficking in Human Beings and New Forms of Slavery, October 22-23, 1999. Verona, Italy.
- Bartilow, Horace. 2010. Gender Representation and International Compliance Against Human Trafficking. Mimeo.
- Belser, Patrick. 2005. Forced Labor and Human Trafficking: Estimating the Profits, Working Paper (Declaration/WP/42/2005). International Labor Office. Geneva.



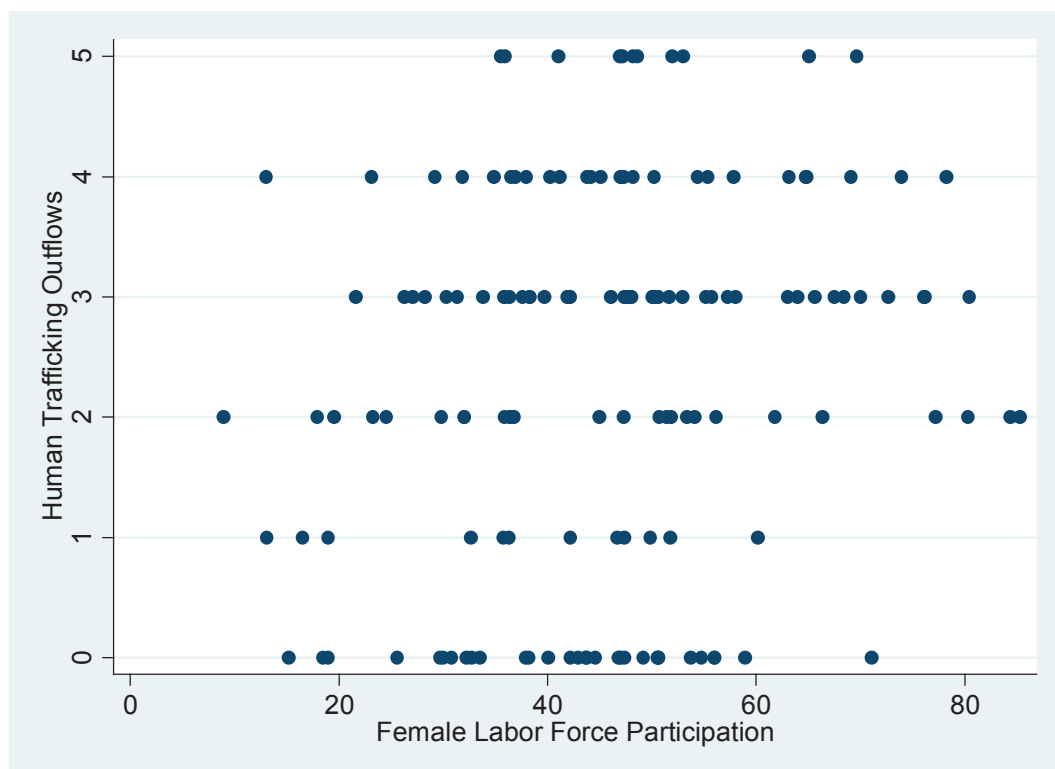
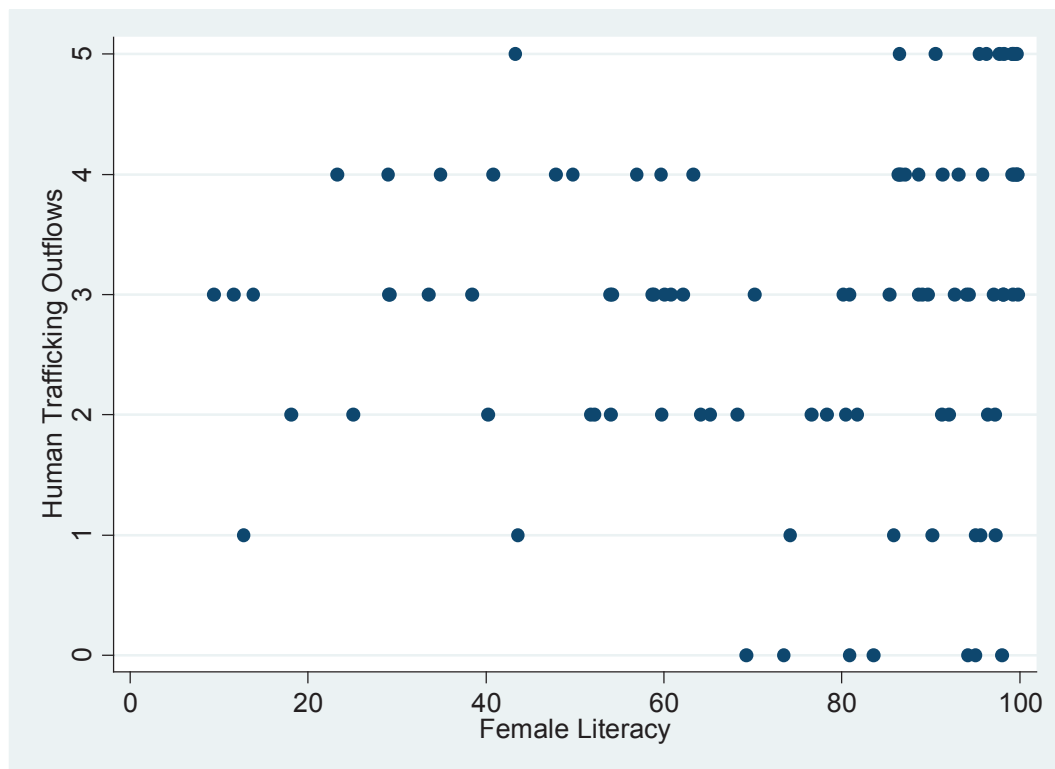
- Bettio, Francesca and Tushar K. Nandi, 2010. Evidence on Women Trafficked for Sexual Exploitation: A Rights Based Analysis. *European Journal of Law and Economics* 29:15-42.
- Cheibub, José A., Jennifer Gandhi and James R. Vreeland. 2010. Democracy and Dictatorship Revisited, *Public Choice* 143, 1-2: 67-101.
- Cho, Seo-Young. 2011. Integrating Equality – Globalization, Women’s Rights, Son Preference, and Human Trafficking. Courant Research Centre: Poverty, Equity and Growth Discussion Paper No. 73.
- Cho, Seo-Young, Axel Dreher and Eric Neumayer, 2011, The Spread of Anti-trafficking Policies - Evidence from a New Index, Cege Discussion Paper 119.
- Cho, Seo-Young, Axel Dreher and Eric Neumayer, 2012. Does Legalized Prostitution Increase Human Trafficking? *World Development* (forthcoming).
- Cingranelli, David and David Richards. 2008. The Cingranelli-Richards (CIRI) Human Rights Data Project Coding Manual. <http://ciri.binghamton.edu/>.
- Clawson, Heather and Mary Layne, 2007. Estimating Human Trafficking into the United States: Development of a Methodology. ICF International. Washington DC.
- Danailova-Trainor, Gergana and Patrick Belser. 2006. Globalization and the Illicit Market for Human Trafficking: an Empirical Analysis of Supply and Demand. ILO Working Paper No. 78. Geneva.
- Di Tommaso, Maria L., Isilda Shima, Steinar Strøm and Francesca Bettio. 2009. As Bad as It Gets: Well-being Deprivation of Sexually Exploited Trafficked Women, *European Journal of Political Economy* 25 (2): 143-162.
- Dreher, Axel. 2006. Does Globalization Affect Growth? Empirical Evidence from a new Index. *Applied Economics* 38, 10: 1091-1110.
- Encyclopedia Britannica Book of the Year. 2001.
- Frank, Richard. 2011. The Political Economy of Human Trafficking. University of New Orleans. Mimeo.
- Freedom House, 2010, Freedom of the Press, <http://www.freedomhouse.org/>.
- Friebel, Guido and Sergei Guriev. 2006. Smuggling Humans: A Theory of Debt-Financed Migration, *Journal of the European Economic Association* 4(6):1085-1111
- Gassebner, Martin, Michel Lamla and James Raymond Vreeland, 2012. Extreme Bounds of Democracy. *Journal of Conflict Resolution* (forthcoming).

- Harrendorf, Stefan, Markku Heiskanen, Steven Malby. 2010. International Statistics on Crime and Justice. European Institute for Crime Prevention and Control and United Nations Office on Drugs and Crime, Helsinki.
- Hernandez, Diego and Alexandra Rudolph, 2011. Modern Day Slavery: What Drives Human-trafficking in Europe? Mimeo.
- International Country Risk Guide. 2009. <http://www.prsgroup.com/>, PRS Group.
- International Labor Organization (ILO), 2005. Database in Global Reports, presented in Belser, Patrick, Michaelle de Cock and Farhad Mehran, 2005, ILO Minimum Estimate of Forced Labour in the World, International Labour Office, Geneva.
- International Organization for Migration (IOM). 2010. Counter Trafficking Module (CTM ). Geneva.
- Interpol. 2009. <http://www.interpol.int/Public/THB/>
- Jac-Kucharski, 2011. The Determinants of Human Trafficking: A US Case Study. Mimeo. University of California, Davis.
- Jakobsson, Niklas and Andreas Kotsadam. 2011. The Law and Economics of International Sex Slavery: Prostitution Law and Trafficking for Sexual Exploitation, *European Journal of Law and Economics* (forthcoming).
- Kangaspunta, Kristiina. 2003. Mapping the Inhuman Trade: Preliminary Findings of the Database on Trafficking in Human Beings. *Forum on Crime and Society* 3 (1 and 2): 81-103.
- Kaufmann, Daniel, Kraay, Aart and Massimo Mastruzzi. 2009. Governance Matters VIII: Aggregate and Individual Governance Indicators 1996-2008, Policy Research Working Paper Series 4978, The World Bank, Washington DC.
- Keefer, Philip. 2010. DPI2010. Database of Political Institutions: Changes and Variable Definitions. Development Research Group, World Bank.
- Koser, Khalid, 2000. Asylum Policies, Trafficking and Vulnerability. *International Migration* 2000(1): 91-111.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny. 1998. Law and finance, *Journal of Political Economy* 106 (6): 1113-1155.
- Leamer, Edward E. 1983. Let's Take the Con Out of Econometrics, *American Economic Review* 73(1): 31-43.
- Levine, Ross and David Renelt. 1992. A Sensitivity Analysis of Cross-Country Growth Regressions, *American Economic Review*, 82(4): 942-63.

- Lloyd, Paulette, Beth A. Simmons and Brandon Stewart. 2012. The Global Diffusion of Law: Transnational Crime and the Case of Human Trafficking. Harvard University, working paper.
- Mahmoud, Toman Omar, and Christoph Trebesch. 2010. The Economic Drivers of Human Trafficking: Micro-Evidence from Five Eastern European Countries, *Journal of Comparative Economics* 38 (2): 173-188.
- Marshall, Monty G. and Keith Jaggers. 2009. Polity IV Project: Political Regime Characteristics and Transitions, 1800-2009," Polity IV.
- Mayer, Thierry Soledad Zignago. 2011. Notes on CEPII's Distances Measures: The GeoDist Database, CEPII working paper No. 2011 – 25.
- Mo, Cecilia. 2011. Perceived Relative Poverty and Risk: An Aspiration-Based Model of Vulnerability. Stanford University, working Paper.
- Neumayer, Eric. 2006. Unequal Access to Foreign Spaces: How States Use Visa Restrictions to Regulate Mobility in a Globalised World, *Transactions of the British Institute of Geographers*, 31 (1): 72-84.
- Neumayer, Eric and Richard Perkins. 2008. Extra-territorial interventions in conflict spaces: Explaining the geographies of post-Cold War peacekeeping, *Political Geography*, 27 (8): 895-914.
- OECD. 2011. Transition Economy and OECD membership  
[http://www.oecd.org/home/0,2987,en\\_2649\\_201185\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1,00.html)
- Outshoorn, Joyce. 2005. The Political Debates on Prostitution and Trafficking of Women. *Social Politics* 12 (1): 141-155.
- Potrafke, Niklas. 2011. Human Anti-trafficking Policies: The Roles of Religion and Political Institutions, mimeo, University of Konstanz.
- Sala-i-Martin, Xavier. 1997. I just Ran Four Million Regressions, *American Economic Review*, 87(2): 178-183.
- Salt, John. 2000. Trafficking and Human Smuggling: A European Perspective. *International Migration* 2000 (1): 31-56.
- Schloenhardt, Andreas. 2001. Trafficking in Migrants: Illegal Migration and Organized Crime in Australia and the Asia Pacific Region. *International Journal of the Sociology of Law* 29: 331-378.

- Soares, Rodrigo R. 2004. Development, Crime and Punishment: Accounting for the International Differences in Crime Rates. *Journal of Development Economics* 73:155-184.
- Tyldum, Guri and Anette Brunovskis. 2005. Describing the Unobserved: Methodological Challenges in Empirical Studies on Human Trafficking in *Data and Research on Human Trafficking: A Global Survey*, edited by Frank Laczko. International Organizations for Migration, Geneva.
- United Nations (UN). 2000. Convention against Transnational Organized Crime and its Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children, New York.
- United Nations (UN). 2008. Surveys on Crime Trends and the Operations of Criminal Justice Systems (CTS)
- United Nations Office on Drugs and Crime (UNODC). 2006, Global Report on Trafficking in Persons, Vienna.
- United Nations Office on Drugs and Crime (UNODC). 2009, Global Report on Trafficking in Persons. Vienna.
- United States (US) Department of State, 2001-2011. Trafficking in Persons Report, Office of the Undersecretary for Global Affairs. United States Department of State Publication, Washington DC.
- Van Dijk, Jan. 2008. *The World of Crime: Breaking the Silence of Problems of Security, Justice, and Development across the World*. Sage Publication, Los Angeles.
- Van Dijk, Jan and Fanny Klerx-Van Mierlo. 2011. Indicators of Corruption: Further Exploitation of the Link between Corruption and Implementation Failure in Anti-trafficking Policies. International Victimology Institute (INTERVICT), University of Tilburg, working paper.
- World Bank. 2011. World Development Indicators.
- Zhang, Sheldon, Brian Finch, and Yang Qin. 2011. Measuring Labor Trafficking with Respondent Driven Sampling: Findings from a U.S. Study. San Diego State University, working paper.

Figure 1. Human Trafficking Outflows and Gender Equality



\* Note: human trafficking outflows (score 0-5) are measured by the UNODC Index (2006).

Table 1. Robust Push Factors (countries of origin/human trafficking outflows)

Variable	Average Beta	Average Std. Error	% Sign	CDF-U
(log)income	-0.183	0.107	0.987	0.999
Information flows	0.039	0.014	0.724	0.964
Transition economy	1.675	6.029	0.953	0.987
Muslim share	-0.008	0.003	0.681	0.961
Fertility rate	-0.610	0.138	0.979	0.998
Food, beverage and tobacco industries	-0.03	0.011	0.975	0.996
Rule of law	-0.381	0.247	0.398	0.916
Control of corruption	-0.522	0.238	0.629	0.961
Infant mortality rate	-0.016	0.008	0.617	0.922
Population age 0-14	-0.089	0.023	0.898	0.986
(log)FDI	0.191	0.073	0.746	0.972
Crime rate	4.422e-07	3.395e-07	0.190	0.901
Europe and Central Asia	0.865	6.023	0.760	0.955
North Africa and Middle East	-1.01	0.418	0.684	0.960

\* Note: Results based on 543,150 regressions using ordered probit (UNODC), probit (US) and negative binomial (ILO) methods. The coefficients of the first six variables are significant in all of the three models. The coefficients of the latter eight variables are significant in two of the three models. Statistics provided are based on results by ordered probit regressions. The base variable is (log) per capital income. ‘Average Beta’ and ‘Average Standard Error’ report the unweighted average coefficient and standard error, respectively. ‘% Sign.’ refers to the percentage of regressions in which the respective variable is significant at least at the 5% level. ‘CDF-U’ is the unweighted CDF as detailed in the text. The threshold to consider a variable robust is 0.9.

Table 2. Robust Pull Factors (countries of destination/human trafficking inflows)

Variable	Average Beta	Average Std. Error	% Sign	CDF-U
(log)income	0.382	0.110	0.965	0.999
Information flows	-0.019	0.011	0.336	0.919
(log)FDI	0.160	0.070	0.810	0.963
Language fractionalization	1.281	0.436	0.949	0.994
Employment in agriculture	0.024	0.010	0.772	0.981
Refugees	8.763e-07	4.708e-07	0.608	0.941
(log)populations	0.334	0.080	0.996	0.999
International tourism	3.094e-08	1.200e-08	0.801	0.975
Crime rate	1.727e-06	6.095e-07	0.864	0.977
(log) amount of heroin seized	0.0001	0.00005	0.792	0.978
OECD membership	0.729	0.354	0.519	0.954
East Asia and Pacific	0.640	0.362	0.354	0.932
Landlocked country	-0.421	0.256	0.267	0.926
Catholic share	-0.007	0.003	0.772	0.979

\* Note: Results based on 406,159 regressions using ordered probit (UNODC), probit (US) and negative binomial (ILO) methods. The coefficients of the first four variables are significant in all of the three models. The coefficients of the latter ten variables are significant in two of the three models. Statistics provided are based on results by ordered probit regressions. The base variable is (log) per capital income. ‘Average Beta’ and ‘Average Standard Error’ report the unweighted average coefficient and standard error, respectively. ‘% Sign.’ refers to the percentage of regressions in which the respective variable is significant at least at the 5% level. ‘CDF-U’ is the unweighted CDF as detailed in the text. The threshold to consider a variable robust is 0.9.

## Appendix A. Global Datasets on Human Trafficking

Data	Measurement	Countries covered	Years covered	Source
UNODC Incidence of Reporting Index (Origin, transit, and destination)	6 scales: 0 (no reported flow) – 5 (very high flow)	161 countries	1996-2003 (cross-sectional)	UNODC (2006)
ILO Global Report Data (in-/outflows)	Number of cases human trafficking in-/outflows reported in the ILO global dataset	74 countries	1995-2000 (cross-sectional)	Belser et al. (2005)
US Trafficking in Persons Data (Origin and destination)	Dummy variable: 1 if the reported cases are 100 or higher in a given year in a given country; 0, otherwise	Max. 190 countries	2000-2010 (panel)	United States Department of State (2001-2011)

## Appendix B. List of Push Factors Examined

Push Factors	Data sources
(log) income	World Bank (2011)
(log) population	World Bank (2011)
Democracy	Cheibub et al. (2010), Marshall et al. (2010)
Control of corruption	International Country Risk Guide (2009), Kaufmann et al. (2010)
Rule of law	International Country Risk Guide (2009), Kaufmann et al. (2010)
Political stability	Kaufmann et al. (2010)
Voice and accountability	Kaufmann et al. (2010)
External conflict	International Country Risk Guide (2009)
Internal conflict	International Country Risk Guide (2009)
Ethnic tension	International Country Risk Guide (2009)
Ethnic fractionalization	Alesina et al. (2003)
Religious fractionalization	Alesina et al. (2003)
Language fractionalization	Alesina et al. (2003)
Refugee and IDP populations	World Bank (2011)
Transition economy (dummy)	OECD (2011)
Landlocked country (dummy)	Mayer and Zignago (2011)
Female unemployment rate	World Bank (2011)



Unemployment rate	World Bank (2011)
Labor force participation rate	World Bank (2011)
Female labor force participation rate	World Bank (2011)
Share of rural populations	World Bank (2011)
Infant mortality rate	World Bank (2011)
Physicians (per 1,000 people)	World Bank (2011)
Crime rate	United Nations (2008)
GINI index	World Bank (2011)
Prostitution law	Cho et al. (2012)
Women's economic rights	Cingranelli and Richards (2009)
Women's social rights	Cingranelli and Richards (2009)
Female literacy rate (% of female age 15 or above)	World Bank (2011)
Female literacy rate (% of female age 15-24)	World Bank (2011)
Literacy rate (% of people age 15 or above)	World Bank (2011)
Literacy rate (% of people age 15-24)	World Bank (2011)
KOF Social Globalization Index- Information flows	Dreher (2006)
Mortality rate under five	World Bank (2011)
Infant mortality rate	World Bank (2011)
Urbanization	World Bank (2011)
Visa restriction	Neumayer (2006)
Number of UN peacekeepers sent abroad normalized by populations	Dreher (2006)
Number of UN peacekeepers residing in the country normalized by populations	Neumayer and Perkins (2008)
Trade (share in GDP)	World Bank (2011)
(log) FDI	World Bank (2011)
Food production index	World Bank (2011)
Share of food, beverage and tobacco industries in GDP	World Bank (2011)
Anti-trafficking Prevention policy	Cho et al. (2011)
Anti-trafficking Prosecution policy	Cho et al. (2011)
Anti-trafficking Protection policy	Cho et al. (2011)
OECD membership (dummy)	OECD (2011)
Regional dummy: East Asia and Pacific	World Bank (2011)
Regional dummy: Europe and Central Asia	World Bank (2011)
Regional dummy: Latin America and Caribbean	World Bank (2011)
Regional dummy: North Africa and Middle East	World Bank (2011)
Regional dummy: North America	World Bank (2011)
Regional dummy: South Asia	World Bank (2011)
Regional dummy: Sub-Saharan Africa	World Bank (2011)
Share of Muslim in populations	Encyclopedia Britannica Book of the Year (2001)
Share of Catholic in populations	Encyclopedia Britannica Book of the Year (2001)
Share of Protestants in populations	Encyclopedia Britannica Book of the Year (2001)
British legal origin (dummy)	La Porta et al. (1998)
Socialist legal origin (dummy)	La Porta et al. (1998)

French legal origin (dummy)	La Porta et al. (1998)
German legal origin (dummy)	La Porta et al. (1998)
English speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
French speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Spanish speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Portuguese speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
German speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Refugees (share in populations, countries of origin)	World Bank (2011)
Rural populations (share in total populations)	World Bank (2011)
Emigration rates of tertiary educated	World Bank (2011)
Net migrants	World Bank (2011)
Fertility rate	World Bank (2011)
Population age 0-14 (share in total population)	World Bank (2011)
Population density (people per sq.km of land area)	World Bank (2011)
Consumer price index	World Bank (2011)
Poverty measure (headcount)	World Bank (2011)
(log) amount of heroin seized	United Nations (2008)
Human Rights Index: Physical integrity	Cingranelli and Richards (2009)
CO2 Emissions	World Bank (2011)

#### Appendix C. List of Pull Factors Examined

<b>Pull Factors</b>	<b>Data sources</b>
(log) income	World Bank (2011)
Democracy	Cheibub et al. (2010), Marshall et al. (2010)
Control of corruption	International Country Risk Guide (2009), Kaufmann et al. (2010)
Rule of law	International Country Risk Guide (2009), Kaufmann et al. (2010)
Political stability	Kaufmann et al. (2010)
Voice and accountability	Kaufmann et al. (2010)
External conflict	International Country Risk Guide (2009)
Internal conflict	International Country Risk Guide (2009)
Ethnic tension	International Country Risk Guide (2009)
Ethnic fractionalization	Alesina et al. (2003)
Religious fractionalization	Alesina et al. (2003)
Language fractionalization	Alesina et al. (2003)
Leftwing executive	Keefer (2010)

Rightwing executive	Keefer (2010)
Media freedom	Freedom House (2010)
Prostitution law	Cho et al. (2012)
(log) amount of heroin seized	United Nations (2008)
Women's economic rights	Cingranelli and Richards (2009)
Women's social rights	Cingranelli and Richards (2009)
KOF Social Globalization-personal contacts	Dreher (2006)
KOF Social Globalization-information flows	Dreher (2006)
KOF Social Globalization-cultural proximity	Dreher (2006)
Unemployment rate	World Bank (2011)
Employment in agriculture (share in total employment)	World Bank (2011)
Literacy rate	World Bank (2011)
Mortality rate under five	World Bank (2011)
Infant mortality rate	World Bank (2011)
Refugees (share in populations, countries of asylum)	World Bank (2011)
Share of migrants in population	World Bank (2011)
(log) populations	World Bank (2011)
Population age 65 or above (share in total populations)	World Bank (2011)
International tourism, number of departure	World Bank (2011)
Urbanization	World Bank (2011)
Visa restriction	Neumayer (2006)
Trade (share in GDP)	World Bank (2011)
(log) FDI	World Bank (2011)
Share of food, beverage and tobacco industries in GDP	World Bank (2011)
Energy use	World Bank (2011)
Anti-trafficking Prevention policy	Cho et al. (2011)
Anti-trafficking Prosecution policy	Cho et al. (2011)
Anti-trafficking Protection policy	Cho et al. (2011)
No punishment of victims	Cho et al. (2011)
Crime rate	United Nations (2008)
Number of UN peacekeepers sent abroad normalized by populations	Dreher (2006)
Number of UN peacekeepers residing in the country normalized by populations	Neumayer and Perkins (2008)
OECD membership (dummy)	OECD (2011)
Regional dummy: East Asia and Pacific	World Bank (2011)
Regional dummy: Europe and Central Asia	World Bank (2011)
Regional dummy: Latin America and Caribbean	World Bank (2011)
Regional dummy: North Africa and Middle East	World Bank (2011)
Regional dummy: North America	World Bank (2011)
Regional dummy: South Asia	World Bank (2011)
Regional dummy: Sub-Saharan Africa	World Bank (2011)
Share of Muslim in populations	Encyclopedia Britannica Book of the Year (2001)

Share of Catholic in populations	Encyclopedia Britannica Book of the Year (2001)
Share of Protestants in populations	Encyclopedia Britannica Book of the Year (2001)
British legal origin (dummy)	La Porta et al. (1998)
Socialist legal origin (dummy)	La Porta et al. (1998)
French legal origin (dummy)	La Porta et al. (1998)
German legal origin (dummy)	La Porta et al. (1998)
English speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
French speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Spanish speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Portuguese speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
German speaking (official language/spoken by majority, dummy)	Encyclopedia Britannica Book of the Year (2001)
Transition economy (dummy)	OECD (2011)
Landlocked country (dummy)	Mayer and Zignago (2011)

#### Appendix D. Human Trafficking Flows

Inflows: Destination Country List (Source: UNODC 2006)

<b>Very High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Very Low</b>
Belgium	Australia	Albania	Aruba	Algeria
Germany	Austria	Argentina	Bangladesh	Bhutan
Greece	Bosnia and	Bahrain	Belize	Brazil
Israel	Herzegovina	Benin	Brunei	Burundi
Italy	Cambodia	Bulgaria	Darussalam	Chad
Japan	Canada	Burkina Faso	Congo, Republic	Chile
Netherlands	China	Cameroon	of	Congo,
Thailand	Hong Kong,	Cote d'Ivoire	Costa Rica	Democratic
Turkey	China	Croatia	Ecuador	Republic of
United States of	SAR	Curacao	Egypt	Djibouti
America	Taiwan	Dominican	Haiti	Dominica
	Province of	Republic	Indonesia	Ethiopia
	China	El Salvador	Iraq	Fiji
	Cyprus	Equatorial	Ireland	Gambia
	Czech Republic	Guinea	Kyrgyzstan	Georgia
	Denmark	Estonia	Lao People's	Honduras
	France	Finland	Democratic	Jamaica
	India	Gabon	Republic	Liberia
	Kosovo,	Ghana	Libyan Arab	Malawi
	(Serbia and	Guatemala	Jamahiriyah	Maldives
	Montenegro)	Hungary	Luxembourg	Morocco
	Pakistan	Iceland	Mali	Mozambique

Poland	Iran	Niger	Republic of
Saudi Arabia	Kazakhstan	Oman	Moldova
Spain	Kenya	Paraguay	Senegal
Switzerland	Kuwait	Romania	Sierra Leone
United Arab	Latvia	Slovenia	Slovakia
Emirates	Lebanon	Sri Lanka	Sudan
United Kingdom	Lithuania	Uganda	Tajikistan
	Macao, China	United Republic	Trinidad and
	SAR	of	Tobago
	Malaysia	Tanzania	Zambia
	Mexico	Uzbekistan	Zimbabwe
	Myanmar	Yemen	
	New Zealand		
	Nigeria		
	Norway		
	Panama		
	Philippines		
	Portugal		
	Qatar		
	Republic of		
	Korea		
	Russian		
	Federation		
	Serbia and		
	Montenegro		
	Singapore		
	South Africa		
	Sweden		
	Syrian Arab		
	Republic		
	The former		
	Yugoslav		
	Macedonia		
	Togo		
	Ukraine		
	Venezuela		
	Viet Nam		

Outflows: Origin Country List (Source: UNODC 2006)

Very High	High	Medium	Low	Very Low
Albania	Armenia	Afghanistan	Argentina	Brunei
Belarus	Bangladesh	Algeria	Bhutan	Chad
Bulgaria	Benin	Angola	Botswana	Chile
China	Brazil	Azerbaijan	Burundi	Costa Rica
Lithuania	Cambodia	Bosnia	Canada	Egypt
Nigeria	Colombia	Burkina Faso	Cape Verde	Fiji
Moldova	Czech Republic	Cameroon	Congo, DR	Jamaica
Romania	Dominican	Congo	Djibouti	Macao

Russia	Estonia	Cote d'Ivoire	Eq. Guinea	Netherlands
Thailand	Georgia	Croatia	Eritrea	Paraguay
Ukraine	Ghana	Cuba	Gabon	Syria
	Guatemala	North Korea	Gambia	Uruguay
	Hungary	Ecuador	Guinea	Yemen
	India	El Salvador	Iran	
	Kazakhstan	Ethiopia	Iraq	
	Lao	Haiti	Jordan	
	Latvia	Honduras	Lebanon	
	Mexico	Hong Kong	Lesotho	
	Morocco	Indonesia	Madagascar	
	Myanmar	Kenya	Maldives	
	Nepal	Kosovo	Nicaragua	
	Pakistan	Kyrgyzstan	Panama	
	Philippines	Liberia	Rwanda	
	Poland	Malawi	South Korea	
	Slovakia	Malaysia	Somalia	
	Uzbekistan	Mali	Sudan	
	Vietnam	Mozambique	Swaziland	
		Niger	Tunisia	
		Peru	USA	
		Senegal	Zimbabwe	
		Serbia and Montenegro		
		Sierra Leone		
		Singapore		
		Slovenia		
		South Africa		
		Sri Lanka		
		Macedonia		
		Taiwan		
		Tajikistan		
		Togo		
		Turkey		
		Turkmenistan		
		Uganda		
		Tanzania		
		Venezuela		
		Zambia		

\* Countries with no (reported) in-/outflows are not listed here.