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SEX WORK VS. SEXUAL EXPLOITATION: ASSESSING GUESSTIMATES FOR PROSTITUTION IN THE EUROPEAN UNION

Abstract:

Prostitution regimes in the EU-28 include prohibition, regulation and abolition; economics literature tackles this typology from the perspective of both free sex work and forced labour trafficking. We review the data sources on the demand-side and the supply-side in order to gauge how large is the sex market and informal employment for sex workers. We calculate Estimates 1A and 1B from miscellaneous sources, whereas HIV prevalence among sex workers from World Health Organisation provides Estimates 2A and 2B. We calculate Estimate 3 from victims of sexual exploitation trafficking according to data collected by the UNODC and Eurostat. We design an OLS model to test the five Estimates of prostitution in EU-28 according to GDP per capita, legislation, supply-side and demand-side variables. Last, we assess which might be the most likely Estimates as regards GDP enhancement in 2010, with respect to National Accounts adjustment for illegal production and consumption expenditure. Hence, we come up with a lower bound Estimate that may be used as a benchmark for macroeconomic policy.

Keywords:

EU-28; informal employment; National Accounts; Non Observed Economy; prostitution; sex work; sexual exploitation trafficking.

JEL Classification: E26, J46, O17

1. Introduction

Prostitution, the controversial so-called “oldest profession”, raises moral and economic issues such as social stigma, health risks and tax evasion, echoing the economists (Mandeville, Malthus and Stuart Mill) whose doctrines inspired current legislation regarding prostitution in the European Union (EU-28). Advocacy for *laissez-faire* (Hakim, 2015) confronts the virtuous stance on abolition (Charpenel, 2013).

Prostitution is back again on the agenda: the EU political arena (Mendez Bota, 2014; Schulze, 2014) discussed the issue, which also deserves special attention from Eurostat since illegal production and namely prostitution is included into the national accounts since 2010. Strangely enough, no assessment has been yet applied to varied expert calculations. It is our purpose to fill the gap and provide a tentative benchmark for the EU-28, wherein three different policy regimes rule prostitution: *prohibition*, *regulation* and *abolition*, which all ban human trafficking for sexual exploitation.

Prohibition makes prostitution illegal as well as the prostitute liable to penalties in four Member States (Croatia, Lithuania, Malta and Romania until decriminalisation in 2013), which account for 1.63 percent of EU GDP and 5.5 percent of total population of the EU-28 in 2010.

As for *regulation*, in line with Mandeville (1724), prostitution is a legal trade in brothels, including tax collection and labour contracts for sex workers, in four Member States, which contribute 29.2 percent EU GDP and almost one fourth (23.26 percent) of total population in 2010: Austria, Germany, Greece and the Netherlands.

Abolition, in line with Stuart Mill (1870) and the United Nations Universal Declaration of Human Rights (1948), advocates that sexual exploitation should be extinct as well as non-coercive sex trade. Pimps and brothels managers should be prosecuted, but not the prostitutes themselves. This policy regime applies to the remaining 20 Member States[1] that account for 69.1 percent EU GDP and 71.2 percent of total population in 2010.

There are two distinct but related approaches. One addresses the issue of prostitution as legal sex work, a market economic activity that deserves thorough analysis in terms of supply and demand. The other one addresses the issue of coercive prostitution in terms of victims of sexual exploitation or forced labour; the emphasis is upon illegal trafficking within a given country as well as cross-border migration, which is used as an approximation in order to estimate overall prostitution including both coercive and non-coercive sex work that actually blurs such distinction.

The paper is structured as follows. Section two reviews the economics literature with respect to sex work and sexual exploitation. Section three records the data sources on the demand-side and the supply-side in order to assess how large is the sex market. Section four addresses five estimates on the supply-side: HIV prevalence amongst female sex workers provides Estimates 1A and 1B; we calculate Estimates 2A and 2B

[1] *Neoabolitionism* emphasizes the prosecution of customers in Sweden and France.

from data collected by international NGOs; we design Estimate 3 from victims of sexual exploitation trafficking according to Eurostat and the UNODC in 2010. Section five designs an OLS model to test the five Estimates for prostitution according to GDP per capita, legislation, supply-side and demand-side variables. Section six checks Estimates of prostitution as regards National Accounts adjustment for illegal production as well as from consumption expenditure. Conclusion discusses what might be the most likely Estimates according to adjusted National Accounts figures for 2010.

2. Literature review on prostitution

Two strands in the recent economics literature address prostitution and few papers deal with the empirical issue. One explores various theoretical models based upon and extending the general assumption of rational choice behaviour from sex workers. The other one focuses on victims of sexual exploitation.

Edlund and Korn (2002) design the first formal model of occupational choice involving voluntary prostitution according to rational choice. They state the prostitution puzzle as “low-skilled, labor intensive, female, and well paid” and explain that sex workers draw a compensating differential due to the foregone opportunity to “sell’’ their fertility in the marriage market.

Della Giusta et al. (2009) extend the standard model of rational action, including social interactions and social sanctions. They focus upon stigma as a loss of reputation, which affects social standing for both clients and sex workers. Attitudes towards the exchange of paid sex shape the dynamics of demand and supply and the resulting markets.

Farmer and Horowitz (2013) intermediaries into a theoretical analysis of market structure with heterogeneous buyers and sellers as well as information asymmetry. The market is segmented into separating equilibria and intermediaries affect the distribution of surplus. If brothels are authorized, they are likely to reduce information asymmetry and costs as well as promote economies of scale and quality.

Lee and Persson (2015) model a semi-coerced market with voluntary prostitutes and trafficking, investigating whether prostitution laws can reach the socially optimal outcome that would arise in a decriminalized market free from trafficking. No regulatory regime currently used achieves this goal, but a combination of the “Dutch” regulatory and the “Swedish” neo-abolitionist regimes would.

Immordino and Flaviano Russo (2014) set up an equilibrium model of prostitution wherein potential clients and sex workers simultaneously interact under three different legal regimes and the harm associated to each. An application to Italy documents a tradeoff between equilibrium and social optimum. Prohibition is more effective at decreasing the total quantity of prostitution services than regulation and laissez-faire regimes. Regulation is more effective than prohibition in alleviating the harm associated with prostitution.

Three papers address the issue of sexual exploitation trafficking.

Akee et al. (2011) use a game-theoretic model to explore the human trafficking market and estimate a gravity model of trafficking upon a sample of 190 countries. They find that domestic and foreign enforcement do mutually reinforce one another, due to mobility, there is partial bargaining power of traffickers and buyers, and demand.is inelastic. Legal prostitution exerts no effect on trafficking in a two-country pair cross-sectional sample (country source to host country); whereas there is a negative effect when using instrumental variables.

Cho et al (2013) address the effect of legalising prostitution upon a global dataset of 150 countries. It will increase demand as well as some potential sex workers (or their pimps) to enter the market. Supply might decline due to tax collection. However, prostitutes unwilling to comply with tax payment, can operate illegally. The legalisation of prostitution has two opposite effects on the incidence of trafficking, a substitution effect away from trafficking and a scale effect increasing trafficking. Hence, the overall effect is theoretically indeterminate and becomes an empirical issue.

Jakobsson and Kotsadam (2013), using a cross-sectional dataset of 31 European countries from the ILO and UNODC, find a positive effect of legal prostitution on trafficking in. Sexual exploitation trafficking of women is least prevalent in countries where prostitution is illegal, most prevalent in countries where prostitution is legal, and in between in those countries where prostitution is legal but procuring illegal. Case studies of Norway and Sweden, which prosecute buying sex, support the possibility of a causal link from harsher prostitution laws to reduced trafficking.

3. How large is the sex market in the EU on the demand side?

There are various criteria to gauge the market for sexual services depending on their prices, premises and working schedules. Prostitution encapsulates three broad distinct segments: the upper tier or luxury prostitution (escorts and call girls); the intermediate category includes the brothels, bars, clubs, massage parlours and other indoor prostitution; outdoor or street prostitution is the lower tier. Furthermore, some students and housewives participate on a part time basis in addition to full time professionals. It is common knowledge that data on prostitution are scant and expert's calculations are 'guesstimates'. Hence, with few exceptions, we assume that prostitution is an equivalent full-time activity, the magnitude of which we measure, thanks to qualitative and quantitative surveys issued from primary as well as secondary sources.

Box 1. Prices for sex trade and earnings premia

We compiled piecemeal data from 21 EU countries (Czech Rep., France, Luxembourg, Malta, Slovakia, Slovenia and Sweden are missing) from Havocscope Black Market (www.havocscope.com). Prices for street prostitution range from € 13 up to € 63 and € 27 is the average price for twelve countries. Regarding brothels, the range is € 30-67, with an average price of € 45 (eight countries) that stands over one and a half times higher than street prostitution. Escort girls would charge from € 37 up to € 225 in five countries, with an average price of € 125 that stands more than four and a half times as high as that of street prostitution. Weighing outdoor (0.4) and indoor (0.6) prostitution, average price would amount to € 38.

Assuming that these are (net) hourly prices and that prostitutes earn half of the average price, whereas the other half is the pimp's cut, we may compare with median gross hourly earnings for EU-27 employees in 2010 (Eurostat earn_ses_pub2i), namely € 11.8. There is a premium as for earnings from street prostitution (€ 13.5), brothels (€ 22.5) and escorts (€ 62.5).

All studies agree that demand for prostitution comes from men. The issue remains controversial as regards male behaviour. In line with Stuart Mill (1870), abolitionists contend that demand should -and actually can be curbed, whereas Cho et al (2013) assume that demand is inelastic (Malthus, 1798).

Table 1. Proportion of men reporting having commercial sex in the past 12 months

Country	Year	Prevalence of clients of Female Sex Workers	Source
France	1992	1.1%	Natsal
France	1998	0.7%	NEM
Germany (West)	1990	4.8%	Natsal
Germany	1998	0.0%	NEM
Greece	1998	5.3%	NEM
Italy	1992	2.0%	Natsal
Italy	1998	1.7%	NEM
Netherlands	1989	2.8%	Natsal
Portugal	1991	5.4%	Natsal
Portugal	1999	2.4%	NEM
Spain	1990	11.0%	Natsal
UK	1990	2.0%	Natsal
UK	1998	1.0%	NEM

Source: Carael et al (2006)

National surveys on sexual behaviour in Europe developed between 1990 and 2000 (Hubert et al, 1998; Johnson et al, 2001) and addressed the proportion of men reporting having commercial sex in the past 12 months (Table1).

In the early nineties, National surveys on sexual behaviour (Natsal) were conducted in seven Member States upon a sample including only 18–49 years old age group. There are large discrepancies in reported contact with a sex worker: 1.1 per cent in France and 11.0 per cent in Spain. The median value is 4.95 per cent, with a mean of 4.1 per cent.

In the late nineties, surveys based upon the EU New Encounter Module (NEM) upon a sample of all adult age groups cover only five Member States and provide much smaller estimates: The median value is 2.22 per cent, with a mean of 2.65 per cent.

It is worth noticing there is a bias in the early 1990s surveys due to age concentration and small sample size for some countries; hence, one cannot conclude that demand is diminishing.

4. How large is the sex market in the EU on the supply side?

4.1. Estimates of female sex workers from HIV prevalence

We assume that sex workers are overwhelmingly females (90 per cent); hence, we do not address male and transgender prostitution that nevertheless does exist.

Table 2. Estimates of female sex workers from HIV prevalence in the 2000s

Country	Female +15 years old (2011)	Female sex workers as a % of females +15 years old (late 2000s)	Estimate 1A Number of female sex workers (late 2000s)	Female sex workers as a % of females + 15 years old (early 2000s)	Estimate 1B Number of female sex workers (early 2000s)
Austria	2 831 855	0.5	14,16	1.0%	26,944
Belgium	3 599 767	0.2	7,2	0.4%	13,545
Bulgaria	2 500 139	0.3	7,5	0.6%	15,988
Croatia	1 438 394	0.2	2,877	0.5%	7,231
Cyprus	304 272	Na (*0.3*)*	*0,913*	Na (*0.5%)**	*1,521*
Czech Rep	3 622 042	0.2	7,244	0.4%	14,409
Denmark	1 801 669	0.2	3,603	0.4%	7,028
Estonia	455 730	0.5	2,278	1.1%	5,254
Finland	1 753 497	0.1	1,753	0.3%	5,137

France	20 608 570	0.1	20,608	0.2%	38,506
Germany	26 666 646	0.7	186,666	1.4%	385,266
Greece	3 676 071	0.2	7,352	0.4%	14,681
Hungary	3 472 528	0.3	10,417	0.6%	21,222
Ireland	1 539 528	Na (*0.3*)*	*4,818*	Na (*0.5%)**	*7,697*
Italy	19 567 814	0.2	39,136	0.4	7,7283
Latvia	724 906	0.7	5,074	1.5%	12,143
Lithuania	1 063 308	0.4	4,253	0.7%	8,251
Luxembourg	172 648	0.2	0,345	0.4%	0,570
Malta	141 449	Na (*0.3*)*	*0,424*	Na (*0.5%)**	*0,707*
Netherlands	5 538 148	0.3	16,614	0.6%	31,833
Poland	13 580 266	0.3	40,741	0.6%	78,751
Portugal	3 582 038	Na (*0.3*)*	*10,746*	Na (*0.5%)**	*17,910*
Romania	6 866 235	0.4	27,465	0.8%	59,305
Slovakia	1 938 685	0.2	3,877	0.4%	7,658
Slovenia	689 707	0.7	4,828	1.4%	9,671
Spain	15 637 867	0.3	46,914	Na (*0.5%)**	*78,189*
Sweden	3 006 611	0.05	1,503	0.1%	2,799
UK	20 882 796	0.3	62,648	0.5%	96,174
EU-28	168 316 690	*0.3**	541,957	*0.5%**	976,118

Source: Prüss-Ustün et al (2013); Vandepitte et al (2006) Na : Not available. * Median value

In Table 2, we estimate the number of female sex workers using two series of data from HIV prevalence collected from the World Health Organisation. In the first series, data for 23 EU countries relate either to 2000 or 2004 (Vandepitte et al, 2006); we

adjusted for missing data with the median value of HIV prevalence in the EU (0.5 per cent): Estimate 1B of the number of female sex workers is slightly below one million. In the second series, data for 24 EU countries relate to mid and late 2000s (Prüss-Ustün et al, 2013); we adjusted for missing data with the median value of HIV prevalence in the EU (0.3 per cent), Estimate 1A of the number of female sex workers shrinks to slightly over half a million.

Comparing these two series, one should not conclude that the magnitude of prostitution has declined, which would run opposite to the trend in demand. It is quite unlikely a serious drop in HIV prevalence occurred during so short a period that would only be due to safer sex practices, an assumption that is not documented. At last, there is no reason to assume that epidemic recording has deteriorated over time. We have yet no strong clue to decide whether Estimate 1A understates the magnitude of sex work, although Prüss-Ustün et al (2013) acknowledge the survey coverage for female sex workers was adjusted for injection drug use and makes it a conservative estimation; conversely, Estimate 1B may overstate the magnitude.

4.2. Estimates from NGOs

An international NGO defending sex workers (TAMPEP, 2010) sent 600 standardised questionnaires to key organisations among its network in 2008, mostly NGOs and Health Services in direct contact with sex workers. It collected 380 responses that helped building up reports for 23 EU countries; Croatia, Cyprus, Ireland, Malta and Sweden are missing (See Table 2). Some answers regarding earnings suggest that the questions were misunderstood and estimates were not checked. Almost two thirds of sex workers in Europe work indoor. Twelve EU countries wherein the share of migrants among sex workers is above 50 per cent are net importers. Conversely, ten EU countries wherein the share of nationals among sex workers is above 50 per cent are most likely to be exporters. One third of migrants came from EU countries; Romania and Bulgaria were most mentioned countries of origin. The distribution of sex workers is respectively 30 per cent and almost 70 per cent for nationals and migrants. Migrants are highly mobile and more vulnerable as regards working conditions and risks (including HIV as well as deportation); two thirds are prone to be exploited by third party (pimps and brothel managers), whereas the share is one third as for nationals. Hence, most sex workers especially migrants is trapped in forced labour.

In order to fill in the vacuum for the five missing countries from TAMPEP and do justice to other estimates, we collected the figures from the abolitionist Scelles foundation (Charpenel, 2013) and the UNODC (2014) that are included in Table 3.

These figures come from miscellaneous sources (NGOs, the police, etc.) and no information is available as regards coverage and time period for data collection. We compiled all estimates whatever sources for 26 EU countries and completed the missing data for Cyprus and Malta with the median value of the sample. We designed Estimate 2A as the highest of the lowest figures for EU-28 that amounts to 748,000

prostitutes, whereas Estimate 2B from the lowest of the highest figures for EU-28, amounts to 1,310,000 prostitutes.

Table 3. Sex workers in the EU circa 2010: Estimates 2A and 2B from NGOs

Country	Outdoor	Migrants	Number of prostitutes		Estimate 2A: Highest of the lowest	Estimate 2B Lowest of the highest
	(TAMPEP)			(Charpenel)		
Austria	15%	78%	27,000-30,000	5,500-10,000	10,000	27,000
Belgium	34%	60%	15,000-20,000	10,000-15,000	15,000	20,000
Bulgaria	33%	2%	6,000-10,000	8,000-10,000	10,000	10,000
Croatia				6,700	6,700	6,700
Cyprus					*915*	*1,446*
Czech Rep.	19 %	41%	10,000-13,000	5,000-25,000	13,000	25,000
Denmark	25%	65%	5,560	5,500	5,500	5,500
Estonia	2%	5%	1,000-1,200	1,000	1,000	1,200
Finland	10%	69%	5,000-6,000	12,000-15,00	6,000	15,000
France	61%	61%	18,000-30,000	18,000-20,000	20,000	30,000
Germany	13%	65%	400,000	150,000-400,000	150,000	400,000
Greece	60%	73%	10,000	1,200-20,000	10,000	20,000
Hungary	40%	25%	10,000-15,000	8,000-10,000	10,000	15,000
Ireland				1,000	1,000	1,000
Italy	60%	90%	50,000	50,000-100,000	50,000	100,000
Latvia	40%	12%	2,000-3,000	15,000-20,000	3,000	20,000
Lithuania	57%	10%	1,250–1,550		1,550	1,550
Luxembourg	30%	92%	5,000		5,000	5,000

Malta					467	467
Netherlands	11%	60%	10,000-15,000	20,000-30,000	15,000	30,000
Poland	40%	34%	10,000	12,000	10,000	12,000
Portugal	45%	56%	9,700	28,000	9,700	28,000
Romania	64%	2%	2,500-3,800	2,000-23,000	3,800	23,000
Slovakia	73%	2%	7,500		7,500	7,500
Slovenia	2%	30%	1,500-3,000		1,500	3,000
Spain	46%	90%	6,000	300,000-400,000	300,000	400,000
Sweden				1,500	1,500	1,500
UK	23%	41%	58,000-80,000	80,000-100,000	80,000	80,000
EU-28			693,000-730,000	740,400-1,253,700	747,970	1,309,634

Source: Charpenel (2013), TAMPEP (2010), UNODC (2014) and own calculations

4.3. Forced labour, sexual exploitation trafficking and prostitution

The ILO (2012), Eurostat (2013a) and UNODC (2014) provide fragmented information on the patterns of prostitution and its magnitude in the EU. Data available across countries cover the characteristics of victims and trafficking routes. Their main limitation is that recording depends on judicial and police effectiveness. Databases do not collect necessarily from the same source: neither UNODC nor Eurostat collect primary sources, whereas the ILO uses both primary and secondary sources.

4.3.1. Estimate of forced sexual labour trafficking from the ILO

The ILO (2009) designed from experts a list of 67 indicators related to trafficking with respect to recruitment, working conditions and coercion. The subset of indicators for sexual exploitation encapsulates very bad working conditions (including excessive working time and hazardous work), low or no salary (including wage manipulation) and no compliance with labour regulations (including the absence of contract signed and social protection). It leaves room for non-coercive prostitution (including casual activity) that is not related to sexual exploitation.

The ILO (2012) computed a global estimate of forced labour for the 2002-2011 reference period from a capture-recapture investigation based on reported cases from

different sources (research institutes, NGOs and the media). Forced sexual exploitation amounts to 270,000 female victims (98 per cent) and the average duration is less than 18 months for sexual exploitation turover. This Estimate 3A does not gauge the magnitude of overall prostitution.

4.3.2. A Eurostat-UNODC Estimate of sexual exploitation trafficking in the EU

Eurostat (2013a) collected data on human beings trafficking over the period 2008-2010. It is acknowledged that the EU currently lacks reliable and comparable statistical information on trafficking in human beings. This is mainly due to the differences between the Member States in the criminal codes, in the reporting and monitoring systems as well as for the rates of reporting cases to the police, NGOs and other entities. In the year 2010, 24 EU Member States reported a total number of 9,528 identified and presumed victims of trafficking, whereas the total number of identified victims is 5,535. Data are broken down between other forms of forced labour and sexual exploitation, which amounts to the largest share of victims (62 per cent) that are predominantly female (96 per cent). Sexual exploitation includes all forms of forced prostitution whether indoor or outdoor. Most victims detected in EU Member States are citizens from Romania and Bulgaria. Suspected traffickers for sexual exploitation represent approximately 84 per cent of the total number of suspected traffickers over the three reference years.

Box 2. The Palermo Protocol

The United Nations Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, coined as the Palermo Protocol (2000) entered in force in 2003, setting the minimum standards for the elimination of trafficking of human beings in terms of prosecuting traffickers and supporting victims. The United Nations Office on Drugs and Crime (UNODC) is in charge of the implementation and records the victims (UNODC, 2014). The Palermo Protocol states that exploitation of prostitution and trafficking cannot be separated, albeit it does not apply to non-coercive prostitution. Tier 1 gathers the 17 EU Member States that fully comply with the minimum standards. The remaining 11 EU Member States that do not fully comply belong to Tier 2, which gathers countries from all three-prostitution policy regimes. See Table 4.

UNODC (2014) provides some similar patterns for the period 2010- 2012. Among the detected victims trafficked to EU countries, sexual exploitation is prevalent (66.25 per cent). focusing on economic gains involved in exploiting people, domestically or abroad. According to the gap with the country of origin, the richer the destination country, the higher the profits sexual exploitation can generate. The price of women depends on the expected profit and the perceived risk associated with carrying out the crime, as well as the demand for sex services in the destination country. In Central Europe and the Balkans, domestic trafficking accounts for about 80 per cent of the detected victims in accordance with previous findings (TAMPEP, 2010).

We compared and compiled data for victims of sexual exploitation in 2010 from Eurostat (2013a) and UNODC (2014). Table 5 reports the numbers of victims for 20

EU countries. With regard to consistency, we first checked both series of data for the same 18 EU countries; the data do not match for Spain. We computed the missing data thanks to the average share of victims according to the UNODC series. At last, we completed the series for all 28 EU countries, using Eurostat series when available and UNODC otherwise. Large countries such as Italy and Poland did not provide data although they belong to the Tier 1 Palermo Protocol. We calculated the "Number of victims/100000" by dividing "Number of victims of sexual exploitation in 2010" (sixth column) per "Population in 100,000 in 2010" (second column).

In the EU-28, the average number of victims of sexual exploitation is over one (1.16) for a thousand hundred inhabitants in 2010. Bulgaria, Estonia, and Romania as well as Cyprus do not fully comply with the Palermo Protocol and stand above average; such is also the case for Slovenia that is compliant. Fully compliant countries from Western and Southern Europe such as Ireland, Luxembourg, the Netherlands and Spain also stand above average and France is pretty close to average.

Table 4. Victims of sexual exploitation and prevalence in the EU for year 2010

			Sexual exploitation. Number of victims				
EU Member States	Population (100,000)	Palermo Protocol compliant	2010 (Eurostat)	Average. (UNODC)	2010 (Eurostat or UNODC)	/100,000 inhabitants	Prostitution extrapolated (x20x7)
Austria	83,751	Tier 1		*49*	49	0.585063	6,860
Belgium	110,006	Tier 1	43		43	0.390886	6,020
Bulgaria	73,694	*Tier 2*	366	406	366	4.966462	51,240
Croatia	42,898	*Tier 2*	2	6	*4*	0.093243	560
Cyprus	8,397	*Tier 2*	24	24	24	2.85799	3,360
Czech Rep.	104,867	Tier 1	3 (15)	*36*	*45*	0.429114	6,300
Denmark	55,606	Tier 1	50	70	50	0.899179	7,000
Estonia	13,296	*Tier 2*		16	20	1.504144	2,800
Finland	53,752	Tier 1	26	20	26	0.483696	3,640
France	649,787	Tier 1	726	702	726	1.117289	101,640

Germany	817,516	Tier 1	610	419	610	0.746163	85,400
Greece	111,233	*Tier 2*		69	71	0.638295	9,940
Hungary	99,857	*Tier 2*	5	68	48	0.480686	6,720
Ireland	45,708	Tier 1	56	44	56	1.225147	7,840
Italy	593,646	Tier 1		61	57	0.096017	7,980
Latvia	20,746	*Tier 2*	4	4	4	0.192808	560
Lithuania	30,525	*Tier 2*		15	13	0.425868	1,820
Luxembourg	5,118	Tier 1	6		6	1.172241	840
Malta	4,149	*Tier 2*	4		4	0.963881	560
Netherlands	166,558	Tier 1	749	900	749	4.496932	104,860
Poland	380,622	Tier 1		169	169	0.444004	23,660
Portugal	105,727	*Tier 2*		10	17	0.160791	2,380
Romania	201,990	*Tier 2*	482	520	482	2.38625	67,480
Slovakia	53,924	Tier 1	21	13	21	0.389434	2,940
Slovenia	20,501	Tier 1	30	22	30	1.46328	4,200
Spain	466,671	Tier 1	1605	207	1,605	3.439248	224,700
Sweden	9,41557	Tier 1	19	34	19	0.201793	2,660
UK	630,225	Tier 1	170	173	170	0.269745	23,800
EU-28	5,044,944		4,98	4,057	5,484	1.161416	767,760

Source: our compilation from Eurostat (2013a) and UNODC (2014).

According to UNODC (2010) the detection ratio is one in 20 victims of sexual exploitation trafficking and one sex worker in seven would be a trafficking victim[2]. If we use these figures, there would be a flow 100,000 victims for sexual exploitation in the

[2] The multiplier of 20 for every victim detected, comes from a pilot survey tested in Spain, Italy and Finland in the early 2000s. The share of victims among sex workers remains unexplained.

EU 28 in 2010 (5,000 recorded victims times 20) and over 750,000 sex workers. However, UNODC calculates a stock from a flow, ignoring how large is the flow that leaves the market (replacement) or just moves across countries. If net inflow increases, the stock of prostitutes may be rising over time and this should lower prices, unless there is an increase in demand.

We apply the multiplier (times 20 times seven) to the number of victims of sexual exploitation in each country and extrapolate the magnitude of prostitution (see last column in table): we come up with an overall figure of 767,760 prostitutes for EU-28, which is our Estimate 3B. Some results are obviously absurd as regards country distribution: for instance, Germany counts less prostitutes than the Netherlands albeit five times larger a population. Hence, one may be very skeptical as for the accuracy of such a proxy to gauge prostitution at country level (Savona and Stefanizzi, 2007).

5. Testing the estimates of prostitution

We test our five Estimates thanks to OLS regressions based on cross-section data for 28 EU countries, referring to the year 2010. We test the following model:

$$Y_i = \alpha + \beta_1 Prostitution_i + \beta_2 Xi + \beta_3 Sub\text{-}regions_i + \varepsilon_i \quad (1)$$

Y_i represents the various estimates for sex work in country *i*: Estimates 1A and 1B from HIV prevalence, Estimates 2A and 2B from NGOs and Estimate 3B from extrapolated number of victims of sexual exploitation. $Prostitution_i$ is our dummy variable indicating whether prostitution is legal or not. *X* is the vector of explanatory variables, $Sub\text{-}regions_i$, is a dummy variable for regional patterns and ε_i is the error term.

As for the variable $Prostitution_i$, we test both legal status for prostitution and for brothels in country *i*, by testing two dummy variables. First, whether prostitution is legal or not, being 1 in this case and 0 otherwise; second, whether or not third-party involvement (such as brothel manager or pimp) is legal, being 1 whenever brothels are legal and 0 otherwise. In both cases, the sign is expected to be positive.

We impute a number of *explanatory country* variables Xi[3] . *GDP per capita* takes into account the level of economic development that should influence the presence of a high number of sex workers. We include *Total adult population* to take into account the scale effect and we disentangle *Adult female population* on the supply-side from *Adult male population* on the demand-side. Focusing on the supply side, *International female migrant stock per 100 thousand of population* takes into account the importance of female migration in Western and Southern European countries; its sign is expected to be positive. *Unemployment rate of females younger than 25 years* tackles the assumption that the higher is unemployment, the more women may become sex workers; its sign is expected to be negative. *Rate of female part-time workers* tackles the assumption that prostitution may be a part-time job; its sign is expected to be

[3] In order to design the best models we run numerous regressions with several different variables such as the size of households, urbanisation, Internet use, earnings, educational attainment, status in employment and rate of activity for females. In addition, we used ordered probit models to check the ranking of countries, which changes according to estimates. All regressions and probit models as well as data sources are available upon request.

negative. *Control of corruption* and *Tier* are, respectively, the indicators for countries government effectiveness and compliance with the Palermo protocol. Regarding *Sub-region$_i$,* the divide between rich Western and Southern Europe and poorer countries from Eastern Europe (including the Balkans) is designed to catch the imbalance between net sex importers and net sex exporters.

As we use a cross-section dataset, we cannot control for unobserved country heterogeneity by including country fixed effects. The variables *Legal prostitution* and *Legal brothels*, *Adult female population* and *Adult male population* as well as *Total adult population*, *Control of corruption* and *Tier* were tested separately to avoid multicollinearity. All continuous variables were taken in logarithms. Eventually, we dropped *Control of corruption* and *Tier* and well as *Sub-region$_i$,* which were relevant only for Estimate 3 and proved insignificant.

We ranked Estimates according to correlation coefficient and the number of significant variables as follows: Estimates 1B, 1A, 2B, 2A and 3B. The results are recorded in Table 6 we comment hereafter.

GDP per capita is only significant but negative in Estimates 1A and 1B, which may run against the intuition that higher GDP should attract more prostitutes (especially migrants).

On the supply-side, *Adult female population* (aged 15-64) is always very significant (p-value is 0.1) and positive in all Estimates, making sure that prostitutes are women.

Legal brothels is significant in Estimates 1A and 1B (p-value is 0.1) as well as in Estimates 2A and 3B (p-value is 0.05); it proves always positive, in line with the results of existing literature (Cho et al, 2013; Jakobsson and Kotsadam, 2013).

International female migrant stock per 100,000 of population is significant in Estimates 1A and 1B (p-value is 0.01); it is positive in all Estimates save Estimate 3B.

Unemployment rate of females below 25 is very significant (p-value is 0.01) in Estimates 2A and 2B; it proves negative in all Estimates, suggesting that unemployment does not drive prostitution.

Rate of female part-time workers is weakly significant (p value is 0.01) or insignificant and proves negative in all Estimates (save 3B), suggesting that prostitution is a full-time job.

On the demand-side, *Adult male population* (aged 15-64) is always very significant (p-value is 0.01) and positive in all Estimates, making sure that customers are men.

As regards the scale effect, *Total adult population* is always very significant (p-value is 0.01) and positive in all Estimates, in line with the results of Cho et al (2013).

Table 5. Testing the estimates with the OLS models

Best models	Estimate 1A	Estimate 1B	Estimate 2B	Estimate 2A	Estimate 3B
Variables					
LnGDP per capita	**-0.847*** **	**-0.973*** **	0.336	0.054	-0.115
LnAdultfemalepopulation	**1.027*** **				**0.572*** **
Legal brothels	**0.568** **	**0.575*** **	0.725	1.095**	1.327**
Leg prostit.			0.742**	0.836*	0.671
LnFemale migrant stock	**0.415*** **	**0.419*** **	0.216	0.234	-0.635*
Unemployment females	**-0.039*** **	**-0.036*** **	-0.000	-0.010	
Part-time female workers	-0.006	-0.004	-0.024*	-0.025*	0.021*
LnAdultMalepopulation		**1.020*** **	**0.884*** **	**0.907*** **	
LnTotalpopulation					
Constant	11.360***	13.132***	0.716	3.856	12.191***
N	28	28	28	28	28
R^2	0.930	0.931	0.816	0.792	0.747

Source: our compilation Robust standard errors are omitted. *** p<0.01, ** p<0.05, * p<0.1

6. Prostitution and National Accounts adjustment

6.1. The Non Observed Economy (NOE) and illegal prostitution

In search for exhaustiveness dating back to SNA 1993 and ESA 1995 (Eurostat, 2013b), Eurostat (2005) developed a new typology of the Non Observed Economy (NOE) including seven components (N1 to N7), which can be aggregated for purpose of parsimony into four or five categories of unrecorded activities (Gyomai and Van de Ven, 2014). The focus is upon illegal production (N2), which gathers all prohibited activities that are neither registered nor licensed and it encapsulates illegal prostitution as well as trafficking drug and smuggled or regulated goods (tobacco, alcohol, firearms, etc.).

By September 2014, all Member States adjusted their National Accounts to ESA 2010 as for data used to estimate European indicators, in order to ensure comparability. In this connection, member States were requested to compile illegal production (N2). The

core issue is not that the inclusion of illegal production in the GDP count is morally unacceptable, but that calculating the illegal economy in itself is prone to inaccuracies due to coverage. Table 6 records the figures for N2 as well as the share of prostitution from the supply side and the demand side.

Table 6. Illegal production and prostitution contributing to GDP

EU Member States	2010 GDP (€ billion)	N2 as a % of GDP	Prostitution from			
			from the supply-side		from the demand-side	
			As a % of GDP	€ million	As a % of GDP	€ million
Austria	284	0.16%	0.08%	225	0.179%	508.5
Belgium	353	0.37%	0.09%	317.7	Nc*	Nc
Bulgaria	36	0.21%,	0.09%	32.4	0.044%	16.0
Croatia	46	0.7%	0.27%	124.2	Nc	Nc
Cyprus	17	1.09%	0.31%	52.7	0.33%	56.2
Czech Rep.	145	0.53%	0.09%	130.5	0.177%	257.9
Denmark	234	0.14%	0.05%	11.7	Nc	Nc
Estonia	15	0.52%	0.03%	4.1	0.027%	4.1
Finland	180	0.1%	0.03%	54	0.053%	96.0
France	1,933	Nc *(0.21%)*	Nc *(0.11%)*	Nc *(2,170)*	Nc *(0.14%)*	Nc *(2,712.5)*
Germany	2,499	0.1% *(0.23%)*	Nc *(0.13%)*	Nc *(3,248.7)*	Nc	Nc
Greece	230	Na	Na**	Na	0.19%	437.0
Hungary	98	0.85%	0,49%	480.2	0.641%	628.6
Ireland	156	0.73%	0.036%	56.16	0.038%	59.5
Italy	1,549	1%	0.22%	340.8	Nc	Nc

Latvia	18	0.9%	0.088%	15.84	0.103%	18.6
Lithuania	27	Na	Na	Na	0.107%	29
Luxembourg	42	0.23%	0.21%	88.2	0.192%	81
Malta	6	0.3%	0.14%	9	Nc	Nc
Netherlands	591	0.38%	0.085%	502.35	0.192%	1139
Poland	354	0.81%	0.21%	74.34	Nc	Nc
Portugal	173	0.35%	0.29%	501.7	0.367%	635.4
Romania	122	0.46%	0.06%	73.2	0.071%	86.7
Slovakia	66	Na	Na	Na	0.074%	49
Slovenia	36	0,36%	0.13%	46.8	0.225%	81.3
Spain	1,063	0.87%	0.35%	3,720.5	Nc	Nc
Sweden	347	0,14%	0.017%	58.99	0.017%	58.8
UK	1,697	0.58%	0.35%	5,939.5	0.383%	6,504.7
EU-28	12,314	0.491% € 60.457,3	0.173% (25 countries)	€ 21,336	0.178% (20 countries)	€ 21,857.35

Source: Brennan (2014), Casey (2014), Eurostat, FSO (2014), INE (2014), NAI (2014), Walton (2014).
We checked figures with most the National Accounts division of EU-28 Statistics Offices

* Not compiled. ** Not available

As for the revision of National Accounts, N2 coverage is focused on narcotics, prostitution and smuggling alcohol and tobacco. In some countries it may extend to piracy and illegal gambling. On the one hand, an abolitionist country such as France is reluctant to include prostitution in the GDP, arguing on moral grounds that it is not a voluntary exchange, although prostitution is already included to some extent. On the other hand, Germany wherein prostitution is regulated does not bother to include illegal prostitution, arguing that sex work is legal, although Cho et al (2013) point out that the number of illegal sex workers is significant.

According to Dunn et al. (2014), upwards adjustment amounts to 0.4 per cent of EU-28 GDP, which may be a proxy for N2, whereas it is only 0.2 percent for EU GDP as for OECD countries (Van de Ven, 2015).

We compiled estimates for N2 and for prostitution from the supply side as of 23 EU Member States. Coverage for prostitution from the demand side is recorded in *Eurostat nama files* as CP122 in the households' final consumption expenditure by consumption purpose (COICOP) for 19 EU countries in 2010. We included data for Germany from Kazemier and Rensam (2015) and we used adjusted data from *Prostcost* (2015) as for France. We calculated that N2 could amount to 0.49 percent of EU-28 GDP in 2010. Prostitution from the supply side as of 25 EU Member States - a 76.7 per cent share of EU-28 GDP in 2010 - would account for a 0.173 per cent mean. From the demand side as for 20 EU countries in 2010, which is a 50.3 per cent share of EU-28 GDP, prostitution could amount to a 0.178 per cent mean.

6.2. Back to supply and demand for assessing estimates

We inspire from Kazemier et al (2013) to estimate prostitution as a whole, in as much as there are no available country data to compile the various segments of prostitution whether indoor or outdoor.

The turnover of the prostitution industry (*P*) or receipt is the product of the number of prostitutes (*sw*), the number of customers per prostitute (*cust*) and the average price per client (*p*):

$$P = sw \times cust \times p \quad (2)$$

Turnover encapsulates domestic consumption (*C*) and exports (*E*), sexual services to customers from abroad:

$$P = C + E \quad (3)$$

The value added (*VA*) of the prostitution industry is the sum of the domestic consumption (*C*) and exports minus imports (*M*) minus intermediate consumption (*IC*). Imports are the sexual services provided by foreign prostitutes resident in the country plus the consumption of sexual services brought abroad by residents. Intermediate consumption are the expenses of the prostitutes themselves (clothing, condoms and travel expenses) we assume to be 20 percent of turnover:

$$VA = C + E - M - IC \quad (4)$$

Gross earnings of the prostitutes is the turnover or receipt minus intermediate consumption, namely the value added (*VA*). Net earnings or income (*NI*) is gross earnings minus the share of the managers or pimps (the rent, rooms and brothels). We assume that prostitutes pay half the value added (*VA*) to the managers or pimps[4]:

[4] We assume that all prostitutes are subjected to pimps, in as much as we ignore the share of non-coerced prostitution, which might be one third on average throughout the EU (TAMPEP, 2010). Of, course, net earnings could be lower if pimps retain a larger share of gains: Kara (2011) and the ILO (2012) suggest it is 70 per cent, which would include Intermediate Consumption.

$NI = (0.5)\ VA$ (5)

Using the 0.173 per cent mean share of prostitution in GDP, overall share in EU-28 GDP would amount to € 21,336.58 million. Gross sales turnover (including intermediate consumption) would then reach € 21,857.35 million as of a 0.178 per cent mean share of prostitution in GDP.

We assume that the average price per client is € 38 (See Box 1) and the average number of clients (or sex transactions) per prostitute is within the range of 1,040-1,300 over 260 working days throughout the year[5].

Hence, we divide Gross sales turnover (€21,857.35 million) with 1,040-1,300 clients that pay € 38 and we come up with a range of 442,456-553,070 prostitutes, a figure that would match with Estimate 1A (542,000).

We assume that the pimp retains 50 per cent of total earnings (TAMPEP, 2010; Kazemier et al, 2013). Each of the 542,000 prostitutes would get average net earnings per annum up to half € 40,237 (€ 20,163) per year and €1,680 per month.

In as much there are 748,000 prostitutes (Estimate 3A), each one would get average net earnings of € 14,610 per annum and € 1,217.5 per month. In both cases, net earnings are above minimum wages and average annual earnings for all 10 countries of Eastern and Central Europe as well as for Cyprus, Malta and Portugal (*Eurostat_earnings*); hence, there is a premium for prostitution as well as for migration.

On the demand side, the adult male EU population is 168 million. Dividing the € 21,857.35 million total expenditure customers spend on prostitution for an average price of € 38, we come up with 575.193 million sexual services or clients. A crude assumption would be that a 6.6 per cent share of the adult male EU population (168 million) pays for sex at least once a week, a monthly expenditure of € 152. Indeed, the share of adult male customers seems quite large, according to the figures from COICOP and surveys on sexual behaviour.

Conclusion

Data sources on prostitution are scant and rather inconsistent, especially as regards country distribution. To our best knowledge, the five EU-28 estimates we have compiled are the first ones in the economic literature on prostitution. Our sample is small (28 countries) albeit consistent because EU membership is binding with respect to budget issues and the requested harmonisation of National Accounts. Moreover, the EU is an open area for both labour and capital mobility, which makes cross-border trafficking easy. Recalling that the share of countries wherein brothels are legal is close to one fourth of total EU-28 population, our main finding for all models is that the regulation of

[5] As for the UK, figures prove controversial. Abramsky & Drew (2014) estimate the number of clients per prostitute as four to six a day (20, 25 and 30 per week), whereas Kara (2011) suggests eight to ten sex encounters a day in brothel and street prostitution. Assumptions do not match either across countries: Kazemier et al (2013) assume that prostitutes work 40 weeks a year in the Netherlands, whereas Kara (2011) assumes 52 weeks a year in the UK.

legal brothels positively correlates with four Estimates; our results are in line with those of the existing literature.

We also suggest that there is a premium for prostitution, despite some mixed evidence that the upper end segment of the prostitution market may pull prices; conversely, the lower end may be far less profitable. We bring in value added, thanks to the testing of variables related to the supply side (adult females), the demand side (adult males) and the scale effect (adult population), which all prove relevant to the number of sex workers throughout EU-28.

Thanks to OLS tests, we checked these estimates according to some reasonable assumptions with respect to supply and demand, in order to avoid major inconsistencies. We acknowledge that adjusted National Accounts may not capture the full magnitude of prostitution, whereas assumptions regarding both customers and prices are disputable. However, we can assess a few plausible figures for prostitution in the EU-28 as follows. Estimate 1A from HIV prevalence (542,000 prostitutes) is consistent with National Accounts, with respect to the demand side and the supply side; it is likely to be a lower bound for prostitution in the EU-28 as of 2010. Although it is less robust and consistent with National Accounts, Estimate 2A as highest of the lowest (748,000 prostitutes), is likely to be a middle bound for prostitution, whereas Estimate 1B from HIV prevalence (976,118) is quite robust and likely to stand as a high upper bound. Estimate 3B that was extrapolated from victims of sexual exploitation (768,000 prostitutes) is lacking both robustness and consistency. Estimate 2B as the lowest of the highest (1,310,000 prostitutes) is not an unreliable upper bound for prostitution in the EU-28 as of 2010; otherwise, it would imply the National Accounts underestimate prostitution by factor 2.4, which seems quite unlikely.

There are limitations in our study that better data should overcome to some extent.

The first limitation is that of any cross-section analysis upon a small sample. In the absence of a reliable database for prostitution, we did not use panel data; hence, we did not address the dynamics of prostitution. We have no robust variable addressing the demand side such as a proxy for customers that deserves dedicated surveys upon sexual behavior as well as National Accounts data for prostitution expenditure. Last, we have little evidence regarding either the share of sexual exploitation (namely coercive prostitution) *vs*. non-coercive prostitution, or the share of salaried *vs.* self-employed prostitutes that deserve dedicated surveys.

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