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Abstract | The true extent of crime victimisation is unlikely to ever be known, yet new statistical techniques offer a promising method of uncovering the 'dark figure' of hidden victimisation. One such technique is multiple systems estimation (MSE), which counts the overlap of victims appearing in different combinations across multiple data sources.

Using this technique, it is estimated that the number of human trafficking and slavery victims in Australia in 2015–16 and 2016–17 was between 1,300 and 1,900. This means there are approximately four undetected victims for every victim detected.

Quantifying the extent of human trafficking and slavery victimisation enhances our understanding of the problem and provides a sound evidence base for informing policy development, the provision of victim support and law enforcement activities.

Estimating the dark figure of human trafficking and slavery victimisation in Australia

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Introduction

Governments, researchers and the general public have long desired to know the size of the crime problem affecting the community. Each year, substantial effort is directed at collecting data, producing statistics and analysing trends to better understand the amount of crime that is occurring and who it is affecting. In the case of modern slavery – encompassing human trafficking, slavery and slavery-like practices such as forced marriage and forced labour – there has been sustained interest in its nature and extent since criminalisation in Australia in 2005. The aim of this study is to estimate the prevalence of human trafficking and slavery in Australia, using the statistical method of multiple systems estimation (MSE).

WALK FREE FOUNDATION

Between 2004 and 2017, 841 possible cases of human trafficking and slavery were reported to the Australian Federal Police, resulting in 350 victims being referred to the Support for Trafficked People Program and 21 offenders being convicted. Since 2013, Australian Federal Police referrals reveal a substantial downward trend in the number of sexual exploitation cases at the same time as a substantial increase in the number of forced marriage cases, while reported cases of labour exploitation remained stable (Table 1).

Table 1: Human trafficking and slavery referrals to the Australian Federal Police, 2013–14 to 2016–17

	2013–14		2014–15		2015–16		2016–17	
	n	%	n	%	n	%	n	%
Forced marriage	11	16	33	28	69	41	70	47
Sexual exploitation	31	44	34	29	39	23	20	13
Labour exploitation	22	31	33	28	36	21	38	25
Other	6	9	19	16	25	15	22	15
Total	70		119		169		150	

Note: Percentages may not total 100 due to rounding
Source: Interdepartmental Committee on Human Trafficking and Slavery forthcoming

Numerous Australian parliamentary inquiries have concluded that prevalence is contested, particularly regarding the extent to which different industries are affected, and that estimates are affected by the lack of comprehensive and accurate data (see, for example, Parliamentary Joint Committee on Law Enforcement 2017). Enhancing our knowledge of human trafficking and slavery victimisation can therefore contribute to a more informed evidence base to orient policy, service provision and law enforcement activities; target interventions and initiatives; develop tools and training; and estimate costs of crime.

Measuring the prevalence of crime

Determining the prevalence of any crime is difficult – even more so for crimes that are clandestine in nature. For this reason, the unknown volume of crime is often referred to as the 'dark figure' (Coleman & Moynihan 1996). Different methodologies have been employed to reveal more accurate figures of crime affecting the Australian community, each with its own strengths and limitations. Criminal justice statistics (ie recorded crimes) have long been used as a measure of prevalence, but they do not always offer a true representation of the extent of many crime problems. Officially recorded incidents reflect only the known part of the true volume of crime (van Dijk & van der Heijden 2016). Many crimes do not come to the attention of authorities, and may not be recorded even if reported. Criminal justice statistics are therefore influenced by reporting and recording practices. This is compounded in the case of modern slavery, where the collection of statistics is affected by the clandestine nature of these crimes, low reporting due to mistrust in authorities and fear of deportation, affected individuals not identifying as victims, and victims not being correctly identified as such by the professionals who encounter them (Richards & Lyneham 2014; Silverman 2014).

Household surveys, victimisation surveys and surveys of representative samples of crime victims can supplement officially recorded crime statistics and reveal the extent of unreported incidents. Surveys are therefore effective for enumerating many crime types (Silverman 2014). However, modern slavery is not suited to quantification through surveys because victims may still be in a situation of exploitation and therefore unable to participate, they are likely to leave the country once they have left their exploitative situation, they may not view themselves as victims and will not report as such, or they may not be comfortable providing accurate answers to sensitive questions about their experience (Silverman 2014; van Dijk & van der Heijden 2016). Surveys are also expensive to administer and may not be appropriate for estimating modern slavery in developed countries, where locating participants can be very difficult.

The global scale of modern slavery

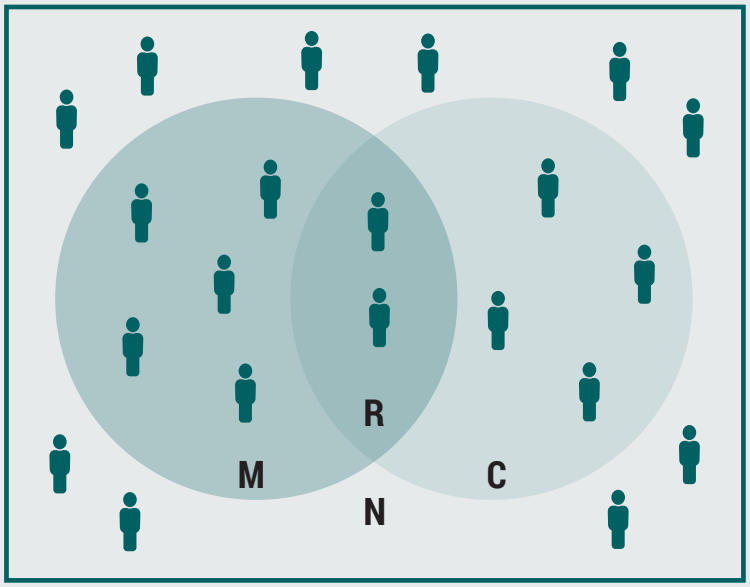
Internationally, significant effort has been directed at better understanding the nature and scale of modern slavery. For example, the Global Report on Trafficking in Persons (by the United Nations Office on Drugs and Crime, or UNODC), the Global Estimates of Modern Slavery (by the International Labour Organization and Walk Free Foundation in partnership with the International Organization for Migration), and the Global Slavery Index (by the Walk Free Foundation) have employed varied methodologies to contribute to the global picture of modern slavery victimisation. The UNODC's *Global report on trafficking in persons* provides data on detected victims supplied by United Nations member states via a questionnaire (completed by 136 countries for the most recent edition). It is able to disaggregate victim data by age, gender and form of exploitation. The Global Estimates of Modern Slavery were produced using a combined methodology of national probabilistic surveys (for 54 countries) and analysis of International Organization for Migration administrative data on the number of victims assisted. The Global Slavery Index also draws upon data from these national probabilistic surveys, combined with vulnerability modelling. Each has reported victimisation numbers ranging from 63,251 detected victims (UNODC 2016) to 40.3 million estimated victims (Walk Free Foundation 2016) worldwide. These reports also indicate that the profile of modern slavery victimisation is changing, particularly with the inclusion of forced marriage in both detected and estimated populations.

What is multiple systems estimation?

Multiple systems estimation (MSE) is a statistical technique ideal for estimating hidden or hard-to-observe populations. It estimates the unknown or 'dark figure' based on the overlaps that can be observed across multiple samples of a population. It does so by applying a capture-recapture method to individual members of a population who are detected and recorded within independent recording systems (called 'lists') (Bird & King 2018). Individuals are matched across lists to count the various combinations in which they appear.

The formula for calculating the unknown figure is $N=(M\times C)/R$, where M is the number of individuals contained in one list, C is the number of individuals contained in another list, and R is the number of individuals who appear in both lists (see Figure 1). The number of possible combinations expands with more lists. The smaller the overlap, the greater the total population is estimated to be, and vice versa.

Figure 1: Capture-recapture estimation using two lists



Source: Adapted from Green 2013

There are four assumptions that underpin capture-recapture analysis (Green 2013; van Dijk & van der Heijden 2016):

- the overlap between lists can be correctly identified (ie individuals can be matched across lists);
- the population of interest does not change during measurement (ie it is a closed system);
- each individual has an equal probability of being captured; and
- the lists are independent (ie capture in one list does not affect the probability of capture in another list).

Where three or more lists are used, the validity of the last three assumptions has less impact on the results and can be accounted for in the analysis.

MSE has been used extensively in the field of ecology to estimate the size of wildlife populations but has more recently been used in human rights, social justice and criminal justice contexts to estimate the numbers of conflict deaths, homeless persons, drug users, and victims of human trafficking (Bird & King 2018; Fisher et al. 1994; Kruger & Lum 2015; Lum, Price & Banks 2013; Silverman 2014; UNODC 2018a, 2018b, 2018c; van Dijk & van der Heijden 2016).

Applying multiple systems estimation to modern slavery

MSE overcomes some of the challenges associated with other approaches to quantifying modern slavery. The first application of MSE to estimate a population of modern slavery victims was undertaken in the United Kingdom in 2014 using a sample of 2,744 victims appearing across five lists (Silverman 2014). The study estimated that the actual victim population size was 11,300 (range of 10,000 to 13,000), suggesting that 20–30 percent of victims were being detected. The next applications of MSE to modern slavery were developed in fulfilment of the United Nations Sustainable Development Goals adopted in 2015, which call on member states to report the number of victims of human trafficking per 100,000 population, by gender, age and form of exploitation (Indicator 16.2.2; UNODC 2018d). Through a partnership with UNODC and the Walk Free Foundation, an estimate for the Netherlands was reported in 2016 (van Dijk & van der Heijden 2016), and estimates for Ireland, Romania and Serbia were reported in 2018 (UNODC 2018a, 2018b, 2018c). The results of the studies reveal that in 2016 there were approximately 17,800 victims in the Netherlands, 200 victims in Ireland, 1,200 victims in Romania and 970 victims in Serbia. Victimisation rates were higher for females, and child victims were less likely to be detected than adults.

Aim and method

Estimating modern slavery victimisation in Australia

Australia is the sixth country to produce an estimate of modern slavery victimisation using MSE. Unlike other countries where MSE has been used to estimate the prevalence of modern slavery victimisation, Australia does not have a central national database for collating victim information. Rather, victim information is held by a range of organisations that may come in contact with victims for various reasons. Some of these organisations are independent from one another, while others have a referral function. Victim lists were obtained from five of these organisations.

A total of 414 potential victims were recorded across the five lists. Most victims appeared on only one list – for example, 198 victims appeared on List C only and 100 victims appeared on List D only. Victims were unlikely to be recorded on more than two lists, although a small number appeared on up to four of the lists. The count of observed victims appearing in various combinations across the four lists is presented in Table 2.

As there was one list that did not overlap with any other, this list was combined with a similar list. Combining these lists did not impact the overall results. One list approached dependence with another list, meaning that victims on one particular list were likely to also appear on another. However, the dependent list was retained for the purpose of analysis because the independence of lists is not critical when there are more than two lists.

Table 2: Count of observed victims

List A				X			X	X	X		X	X	X
List B			X		X	X	X		X	X	X	X	
List C	X		X		X		X	X			X		
List D		X			X					X	X	X	X
Count	198	100	36	34	15	13	6	4	3	2	1	1	1

Source: Estimating modern slavery victimisation using MSE, 2015–16 to 2016–17 [AIC computer file]

Analysis of the four lists aimed to address the following questions:

- What is the total number of presumed victims in Australia?
- What is the ratio of detected to undetected victims?
- What is the rate of victimisation per 100,000 population?

The results estimate the prevalence of modern slavery in Australia. The findings should be treated with caution because the model is based upon assumptions that apply to the natural world that cannot be easily verified for data involving humans. Also, a linkage key was used to de-identify the victim data and matching was then undertaken using the linkage key. All due care was taken to accurately match the data, but there are inherent limitations with this process.

Results

The estimated number of modern slavery victims in Australia over the two-year period from 2015–16 to 2016–17 was 1,567 victims (including the 414 observed victims). Accounting for a five percent margin of error, the number of actual victims is between 1,342 and 1,897.

The results indicate that 26 percent of victims are being detected, with a lower estimate of 20 percent and an upper estimate of 30 percent. This equates to a ratio of 1:4. That is, there are estimated to be four undetected victims for every detected victim in Australia. The dark figure of modern slavery victimisation was therefore estimated to be 1,153 victims, meaning that between 928 and 1,483 victims remain undetected.

Figure 2: Estimated ratio of detected to undetected victims

For every victim detected,
four go undetected

The victimisation rate was found to be approximately 3.3 per 100,000 population per year. This was calculated using the total Australian population, although it should be noted that the majority of observed victims are adults.

The details of the fit for this model are presented in Table 3.

Table 3: Details of model fit

Abundance	95%CI	Standard error	Deviance	Degrees of freedom	AIC	BIC
1153	928–1483	138.2	134.87	9	198.738	222.894

Note: CI=confidence interval; AIC=Akaike information criterion; BIC=Bayesian information criterion
Source: Estimating modern slavery victimisation using MSE, 2015–16 to 2016–17 [AIC computer file]

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