Drug Policy Modelling Program

DPMP Drug Policy Modelling Program

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The impact of heroin seizures (Economic back of the envelope calculations)

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Rationale

There are many things not known about the heroin market in Australia. Its illicit status and the relatively low numbers of participants give researchers and policy makers few opportunities to develop a precise understanding of its size, composition and dynamics. Singer (1971) demonstrated that, in such a situation, simple quantitative analysis can provides insights. In his analysis of the amount of crime committed by heroin addicts in New York City, Singer compared numbers against each other and used general knowledge to show that widely used figures had no basis in fact. The approach has also been used to develop plausible numbers where none exist.

One example where simple quantitative analysis can provide insights is in the area of the impact of heroin seizures on consumption. The purpose of this project was to establish the rate of heroin seizures relative to the overall size of the heroin market in Australia. In addition, it provided the opportunity to review various useful 'numbers' that will be used in Stage Two DPMP analyses.

Approach

We estimated heroin consumption rates from available data sources, generating a "low", "main" and "high" estimate. We used data reported by the Australian Crime Commission on Australian Federal Police and state police heroin seizures. Using mathematical formulae we then calculated the proportion of all heroin consumption that the seizures represent.

Results

The main estimate of heroin consumption for all Australia was just over 1.4 tonnes of pure heroin. This estimate includes taking into consideration the numbers of regular users, the numbers of recreational users, weekly expenditure and the rates of injection. The table below demonstrates the variables used and shows the low, high and midpoint (or main) estimate.

Table 1: Estimate of annual quantity of heroin consumed in Australia (tonnes)

	Low	*Main*	*High*
Number of regular users	40K	70K	100K
Expenditure by regular users (wk)	$500	$600	$700
Price of a pure g of heroin	$1,700	$1,700	$1,700
Pure heroin / regular users (g)	.29	.35	.41
Pure heroin consumed by all regular users (kg)	612	1,285	2,141
Proportion of heroin consumed by regular users (%)	90	90	90
Total pure heroin consumption (kg)	680	1,427	2,379

The Australian Crime Commission reports seizures by number and weight each year for state and territory police services and for the Australian Federal Police. We turn first to the state police data. State and territory police forces seized 57 kilograms of impure heroin in 2001-02, 103 kilograms in 2002-03 and 33 kilograms in 2003-04. The average of these is 64 kilograms.

This figure needs to be converted into pure heroin. Our Victoria Police seizure data suggests most of these seizures occur at the retail level. The retail level purity was approximately 25% over these years. Therefore, the amount of pure heroin seized by state and territory police forces averaged 16kg over this period.

In the table below, the ranges of amount consumed together with the ranges of pure heroin seized are used to estimate the seizure rate. That is:

> Seizure rate = Amount seized / (Amount consumed + Amount seized)

On these figures, it seems likely the amount seized represents 1% to 2% of the total retail market, and certainly less than 4%.

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Table 2: State police seizure rates for pure heroin (2001-02 to 2003-04)

		Annual estimated consumption		
Year	Seizures (pure heroin, kg)	Low (680k g)	Main (1,427 kg)	High (2,370 kg)
2001-02	14	2.1%	1.0%	0.6%
2002-03	26	3.8%	1.8%	1.1%
2003-04	8	1.2%	0.6%	0.3%
Average	16	2.4%	1.1%	0.7%

For the Australian Federal Police seizures, the formula is as follows:

> Seizure rate = Amount seized by AFP/ (Amount consumed + Amount seized by AFP + Amount seized by State and Territory Police)

The same consumption estimates are used. Using Australian Crime Commission figures again, the amount seized by Australian Federal Police was 427 kilograms of impure heroin in 2001-02, 337 kilograms in 2002-03 and 68 kilograms in 2003-04. This is generally of a purity of about 70%. The amounts of pure heroin seized by the Australian Federal Police are in the table; the average amount over the three years is 194 kilograms. These AFP seizures effectively represent border seizures (heroin entering the country).

Table 3: Australian Federal Police seizure rates for pure heroin (2001-02 to 2003-04)

		Annual estimated consumption plus retail seizures		
Year	Seizures (pure heroin, kg)	Low (696k g)	Main (1,443k g)	High (2,395 kg)
2001-02	14	30.0%	17.1%	11.1%
2002-03	26	24.9%	13.9%	8.9%
2003-04	8	6.4%	3.2%	1.9%
Average	16	20.4%	11.4%	7.3%

These results indicate that the border seizure is estimated to be 11% of pure heroin consumed, although it may be between 5% and 20%. It is certainly significantly higher than the retail seizure rate.

Implications

This exercise has been useful for identifying a lack of consistency in how Australian estimates of different aspects of the heroin market have been generated or used. For example, the most commonly used estimate of the total consumption of heroin in Australia is for pure heroin, but it has often been used in relation to impure heroin (for example by the AFP in their assessment of the economic effects of their seizures). "Testing" the figures shows there are some key definitions that are not consistent, and some basic information is lost as it is transferred from one study to another.

This analysis is but one example of a "back of the envelope" calculation. It is useful for understanding some of the key characteristics of the heroin market. Here, even with the uncertainties associated with our estimates, we find that border heroin seizure rates are not insignificant, and significantly higher than retail seizure rates.

Why does that matter? It is a way of measuring the effectiveness of one aspect of law enforcement. If we want to allocate resources on the basis of where the greatest seizures occur, and there are similar resources committed to both federal interdiction and state policing, then clearly interdiction is the most effective. We can start to consider re-allocating or increasing resources on that basis.

This "back of the envelope calculations" (BOTEC) approach can also help explain differences between countries, and why there may be a need for particular approaches in Australia. For example, comparative analysis of the price mark-ups between Australian heroin and United States cocaine (the dominant imported illicit drug in each country) reveals significant differences. The mark-up for heroin moving from source countries to inside Australia is much higher than for cocaine in the US (a mark-up of 26 times vs. 15 times), while the reverse is true for price mark-ups for movement between mid-level distribution and retail dealing (a mark-up of 2 times for Australian heroin vs. 4 times for US cocaine). It seems that the border seizure rates are higher in Australia than the US, but the retail seizure rates are lower. A

research paper looking at Australia, the United States and the United Kingdom will explore this further, and shed light on the role of law enforcement and the different approaches required in each country.

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