

**INDIVIDUAL BEHAVIOUR IN AUSTRALIA'S
SHADOW ECONOMY: FACTS, EMPIRICAL
FINDINGS AND SOME MYSTERIES**

*Friedrich Schneider, Valerie Braithwaite
and Monika Reinhart*



The Australian National University
Australian Taxation Office

Centre for Tax System Integrity



WORKING PAPER No 19

September 2001

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ISBN 0 642 76818 8

ISSN 1444-8211

WORKING PAPER No 19
September 2001

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Australian National University 2001*

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National Library of Australia

Cataloguing-in-Publication data:

Schneider, F., 1949-

Individual behaviour in Australia's shadow economy:
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Bibliography

ISBN 0 642 76818 8

1. Informal sector (Economics) - Australia. I. Braithwaite,
V. A. (Valerie A.), 1951- . II. Reinhart, Monika. III. Centre
for Tax System Integrity. IV. Title. (Series: Working paper
(Centre for Tax System Integrity); no. 19).

336.24160994

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Series Editor:
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Abstract

This paper attempts to explain the behaviour that motivates individuals to engage in the shadow economy. Results show that those who fear being caught by tax authorities are less likely to supply or purchase work in the shadow economy. Further, those who earn more money in the 'official' economy, work less in the shadow economy, but purchase more shadow economy work. The results of logistic regressions show that when working in the shadow economy is seen as socially acceptable, shadow economy activities are higher.

Additional findings showed that, on average, a shadow economy worker earned AUS\$2135.31 during 2000, and households spent AUS\$2293.00 for these services. Using micro-data to calculate an overall aggregate figure for the estimated size of the shadow economy in Australia during 2000, it was found that between 4.81% and 8.8% of the gross national income (GNI) was earned in the shadow economy.

Individual behaviour in Australia's shadow economy: Facts, empirical findings and some mysteries

Friedrich Schneider¹, Valerie Braithwaite and Monika Reinhart

1. Introduction

Crime and other underground economic activities (including the shadow economy) are a fact of life around the world and most societies attempt to control these activities through various measures such as punishment, prosecution, economic growth or education. Gathering statistics about who is engaged in underground (or criminal) activities, the frequency with which these activities occur, and the magnitude of such activities, is crucial for making effective and efficient decisions regarding the allocation of a country's resources. Given that the individuals who are engaged in such behaviour do not want to be identified, it is difficult to obtain accurate information about the nature and extent of these underground activities. There is also little understanding about what motivates individuals to work in the shadow economy or to request such work.

Although much literature² has been published on single aspects of the hidden economy, and a comprehensive survey has been written by Schneider and Enste (2000), the subject is still quite controversial - compare for example arguments in the feature titled 'Controversy: on the Hidden Economy' in the *Economic Journal Vol. 109*, 1999. There are disagreements about what constitutes a shadow economic activity, the procedures used to estimate the size of the shadow economy as well as on the use of these estimates in economic and policy analysis (for example, the opinions of Tanzi 1999, Thomas 1999 and Giles 1999).

In spite of differing views and continuing debates, there are strong indications that the shadow economy is growing around the world. The size, the causes and the consequences of this increase vary between countries, but there are some comparisons which may be of

¹ This paper was written while Friedrich Schneider visited the Australian National University in February 2001. We would like to thank Tina Murphy for her assistance in the preparation of this manuscript.

² The literature about the 'shadow', 'underground', 'informal', 'second', 'cash' or 'parallel' economy is rapidly increasing. Various topics on how to measure it, its causes and its effect on the official economy have been analysed. See for example, the first publications by Tanzi (1982), Frey and Pommerehne (1984), and Feige (1989); survey related publications by Thomas (1992), Loayza (1996), Pozo (1996), Lippert and Walker (1997), Schneider (1994a, 1994b, 1997, 1998a), Johnson, Kaufmann and Shleifer (1997), and Johnson, Kaufmann and Zoido-Lobaton (1998a); and for an overall survey of the global evidence of its size, Schneider and Enste (2000).

interest to social scientists and the public, and which might also be helpful to governments who need to deal with this phenomenon.

There are several important reasons why politicians and public sector officials should be especially worried about the size and growth of the shadow economy:

- (1) If an increase in the shadow economy is caused mainly by a rise in the overall tax and social security burden, then this may lead to an erosion of the tax and social security bases and finally to a decrease in tax receipts. This will subsequently lead to a further increase in the budget deficit, or to a further increase of tax rates with the consequence of an additional increase in the shadow economy. Therefore an increase in the shadow economy can be seen as a reaction by individuals who feel overburdened by State activities.
- (2) As the shadow economy increases, economic policy will be based on erroneous 'official' indicators (for example, unemployment, official labour force, income, consumption), or at least indicators that are 'inaccurate' in their magnitude. In such a situation a prospering shadow economy may lead to severe difficulties for politicians because it 'causes' or 'provides' unreliable official indicators, and the direction of the intended policy measures may therefore be questionable.
- (3) While an increase in the shadow economy provides strong incentives to domestic and foreign workers and draws resources away from the official economy, it should be mentioned that two-thirds of the income earned in the shadow economy is subsequently returned to the official economy³ (for example, through retail spending) resulting in a considerable positive effect.

These concerns and the scientific fascination of the underground economy have inspired us to tackle this difficult question and to undertake the challenging task of providing some empirical knowledge and insights about why people work in the shadow economy or why people request such work.

³ This figure has been derived from polls of the German and Austrian population about the effects of the shadow economy. For further information see Schneider (1998b). The results of these polls show that two-thirds of the value added produced in the shadow economy would not be in the official economy if the shadow economy did not exist.

Section 2 of this paper presents some basic findings of a survey which asked 7754 Australian households about their tax paying behaviour, whether they evade their taxes, and whether they work in the cash economy or request such work. Section 3 presents some preliminary findings about the factors that might motivate individuals to work (or request work) in the shadow economy, and Section 4 presents data from a preliminary attempt to calculate aggregate figures of the Australian shadow economy. Finally, Section 5 provides a summary of the major empirical findings and the conclusions that can be made from these findings.

2. Some basic survey findings on individual attitudes to the shadow economy

The ‘Community Hopes, Fears and Actions Survey’ (V. Braithwaite, Australian National University) was sent to 7754 Australian households in June 2000. It asked respondents a broad range of questions about their experiences with the Australian Taxation Office (Tax Office), their tax paying behaviour, cash transaction behaviour, their goals for an Australian society, and whether they believed the Tax Office acts in accordance with the standards set out in the Taxpayers’ Charter.⁴ A response rate of 29% was achieved after adjusting for out of scope responses, with 2040 households returning a completed questionnaire. Of these respondents, 118 admitted that they had received cash-in-hand payments in the past 12 months, suggesting that 6.0% of the investigated households work in the shadow economy. In addition, 283 (or 14.4%) respondents said that they requested and received shadow economy work (paid cash-in-hand) in the last 12 months while 29 respondents (1.4%) said they both worked regularly in the shadow economy and hired shadow economy workers.⁵

Table 1 presents the income earned in the shadow economy, the money spent on shadow economy activities and the ‘official’ income situation for shadow economy workers and those who purchase shadow economy work. On average, shadow economy workers earned AUS\$2135.31 a year which is 8.82% in terms of their official income. Of the households that purchased shadow economy work, an average of AUS\$2293.50 was spent annually, or 5.85% of their ‘official’ income. The average hourly wage earned by a shadow economy worker was reported as AUS\$23.29, while the average amount of money spent for this work was reported

⁴ In this paper we will only present the empirical findings with respect to shadow economy attitudes; for other findings see Braithwaite, Reinhart, Mearns, and Graham (2001).

⁵ These figures of shadow economy activities are quite low compared to European results; for example in a survey in Germany 24% of all respondents worked in the shadow economy and 42.5% hired shadow economy workers (compare Schneider, 1999).

as AUS\$48.25 an hour. While unlikely, it appears that those purchasing shadow economy work spend 107% more an hour than a shadow economy worker earns. Table 1 also shows that shadow economy workers have considerably lower incomes than those who purchase shadow economy activities, with the average ‘official’ income of a shadow economy worker being 61.7% of the average ‘official’ income of a person who purchases shadow economy work.

Table 1: Earned income in the shadow economy, money spent for shadow economy activities and the ‘official’ income for both shadow economy suppliers and purchasers

<i>Statistics / Value</i>	Annual income earned by shadow economy workers in AUS\$	Hourly wage of shadow economy workers in AUS\$	Money spent a year for shadow economy activities in AUS\$	Money spent an hour for shadow economy activities in AUS\$	Annual ‘official’ income of shadow economy workers in AUS\$	Annual ‘official’ income of those who purchase shadow economy work in AUS\$
Mean	2 135.31	23.29	2 293.50	48.25	24 200.00	39 217.20
Std. Error of Mean	461.23	2.75	697.05	4.14	1 643.00	2 079.20
Median	500.00	15.00	500.00	30.00	20 000.00	35 000.00
Minimum	70.00	3.00	15.00	1.00	0.0	0.0
Maximum	30 000.00	200.00	150 000.00	450.00	100 000.00	250 000.00
<i>Sum</i>	215 666.00	-	580 255.00	-	2 783 000.00	10 471 000.00
Frequency (Sample size)	101	101	253	253	115	267
Shadow economy activity as % of ‘official’ income					8.82%	5.85%

Source: own calculations

The services provided by shadow economy workers, and the services requested by those who purchase shadow economy work, are shown in Tables 2 and 3. Both tables show differences in the average amount of income earned in the various jobs and the average amount of money spent in the various work areas. They also show differences in the frequencies of the different work/job fields.

Shadow economy workers are mostly engaged for 'repair work in the house and garden' and also for 'teaching, training and entertainment'. Shadow economy work is mostly purchased for 'repair work in the house and garden', 'house services' and 'garden work'. Both Tables 2 and 3 show that on average the highest income earned a year is in the 'car delivery service sector', with AUS\$6089.80 earned by a shadow economy worker and AUS\$7498.67 spent for the service.

In other areas, differences emerge between the estimates in Tables 2 and 3: Shadow economy workers in the area of 'service outside the house' earn on average AUS\$2370.91 a year, while purchasers of this work spend an average of AUS\$5370.41. This suggests that those who work in this area fail to declare the majority of their earnings. The opposite bias occurs in the area of 'teaching, training and entertainment'. Purchasers spend on average AUS\$516.66 a year, whereas workers in the same area earn AUS\$2381.00.

Besides car delivery services, shadow economy workers earn most in the area of 'repair in house and garden' with an average of AUS\$3226.11 a year. The least amount is earned in the area of 'farm and other services' with an average of AUS\$500.00 a year.

Table 2: Services offered by shadow economy workers

Service	Sample (N)	Annual income earned in the shadow economy AUS\$			
		Mean	Std. Deviation	Minimum	Maximum
1) Repair work in the house and garden	18	3 226.11	7 140.23	70	30 000
2) Garden work	7	582.14	649.15	100	2000
3) House services	15	1 123.47	1 877.00	72	6500
4) Service outside house	11	2 370.91	3 035.34	80	10 000
5) Car delivery services	5	6 089.80	9 634.35	400	23 000
6) Teaching, training and entertainment	20	2 381.00	5 190.63	100	22 000
7) Farm and other services	3	500.00	435.89	200	1000
8) Miscellaneous	13	1 715.38	2 569.00	100	10 000
<i>Total</i>	92	2 249.41	4 822.40	70	30 000

Analysis of variance ^a

	<i>Sum of Squares</i>	df	Mean Square	F	Sig.
Between Groups	1.43E+08	7	20 398 008.45	0.868	0.535
Within Groups	1.972E+09	84	23 493 633.56		
Total	2.12E+09	91			

^aMultiple comparisons were performed comparing each group with all other groups. No significant difference was found at the 0.05 level of significance.

Table 3: Services ordered by those who purchase shadow economy work

Work Area	Sample (N)	Annual income spent in the shadow economy AUS\$			
		Mean	Std. Deviation	Minimum	Maximum
1) Repair work in the house and garden	84	1 648.09	5 369.61	20.00	48 000.00
2) Garden work	48	3 692.25	21 588.04	15.00	150 000.00
3) House services	67	1 874.26	4 005.02	20.00	30 800.00
4) Service outside house	12	5 370.41	15 188.20	90.00	53 500.00
5) Car delivery services	6	7 498.66	13 847.92	112.00	35 000.00
6) Teaching, training and entertainment	6	516.66	304.41	150.00	950.00
7) Farm and other services	12	772.41	1 685.44	70.00	6 000.00
8) Miscellaneous	13	1 067.30	1 158.06	25.00	4 000.00
Total	248	2 326.31	10 906.81	15.00	150 000.00

Analysis of variance^a

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.83E+08	7	68 976 496.63	0.573	0.778
Within Groups	2.89E+10	240	120 416 502.28		
Total	2.94E+10	247			

^aMultiple comparisons were performed comparing each group with all other groups. No significant difference was found at the 0.05 level of significance.

Table 4 shows whether households that are engaged in the shadow economy have different attitudes to those who are not. Attitudinal research on tax evasion points to the importance of the perceived likelihood of getting caught (Andreoni, Erard, and Feinstein, 1998; Jackson and Milliron, 1986) and the defensibility of one's actions to self and others (Thurman, St. John, and Riggs, 1984) as motivating factors. These attitudes were assessed by the following two questions:

- (1) Imagine yourself in this situation: You have been paid \$5000 cash for work that you have done outside your regular job. You don't declare it on your income tax return. What do you think the chances are that you will get caught?

- (2) Why do you think people work for cash-in-hand payments? By cash-in-hand payments we mean cash money that tax is not paid on.

When examining the responses to question 1 (see Table 4), it is clear that both suppliers and purchasers engaged in shadow economy activities believe that their chances of being caught are considerably lower compared to the other respondents. For example, 33.0% of shadow economy suppliers and 32.4% of those who purchase shadow economy work think the chance of getting caught is about 0% compared to 15.6% of non-shadow economy workers and 13.9% of non-shadow economy purchasers. Only 9.6% of shadow economy suppliers and 8.4% of those who purchase shadow economy work think the 'chance of getting caught' is about 100%, in contrast to 20.3% of non-shadow economy workers and 21.5% of non-shadow economy purchasers.

One possible explanation given by survey respondents as to why they thought people work for cash-in-hand payments (question 2) is that income taxes are too high. Systematic differences between those engaged in the shadow economy and those who are not were also found. However, the differences were not as clear-cut as the differences found for question 1. Results showed that 37.7% of the shadow economy workers (suppliers) and 23.4% of those who purchase shadow economy work (purchasers) think that people are engaged in the shadow economy because income taxes are too high versus 19.4% of non-shadow economy workers and 19.8% of non-shadow economy purchasers.

Table 4: Attitudes to getting caught and income tax rates among people engaged in shadow economy activities versus those who are not engaged in shadow economy activities

What do you think the chances are that you will get caught ¹⁾	Shadow economy workers /suppliers			Shadow economy work purchasers			Income tax too high ²⁾	Shadow economy workers/ suppliers			Shadow economy work purchasers		
	Yes	No	Sum	Yes	No	Sum		Yes	No	Sum	Yes	No	Sum
About 0%³⁾	33.0% (38)	15.6% (283)	16.7% (321)	32.4% (89)	13.9% (229)	16.6% (318)	Definitely not	1.8% (2)	3.1% (56)	3.0% (58)	2.6% (7)	3.2% (52)	3.1% (59)
About 25%	20.0% (23)	15.4% (279)	15.7% (302)	17.5% (48)	15.5% (259)	15.7% (302)	Unlikely	11.4% (13)	12.5% (226)	12.5% (239)	16.4% (44)	11.8% (193)	12.4% (237)
About 50/50	28.7% (33)	32.2% (584)	32.0% (617)	28.4% (78)	32.7% (537)	32.1% (615)	Unsure	13.2% (15)	17.4% (313)	17.1% (328)	12.6% (34)	17.8% (292)	17.1% (326)
About 75%	8.7% (10)	16.5% (298)	16.0% (308)	13.5% (37)	16.4% (269)	16.0% (306)	Probably	36.0% (41)	47.6% (859)	46.9% (300)	45.0% (121)	47.5% (779)	47.1% (900)
Almost certain (100%)	9.6% (11)	20.3% (367)	19.6% (378)	8.4% (23)	21.5% (354)	19.7% (377)	Definitely	37.7% (43)	19.4% (349)	20.4% (392)	23.4% (63)	19.8% (325)	20.3% (388)
Total	100% (115)	100% (1811)	100% (1926)	100% (275)	100% (1643)	100% (1918)	Total	100% (114)	100% (1803)	100% (1917)	100%	100%	100%
Chi-Square Test (Pearson)	31.941 d.f. = 4 Sig: 0.000			72.289 d.f. = 4 Sig: 0.000			Chi-Sq.T.(P.)	22.659 d.f. = 4 Sig: 0.000			9.56 d.f. = 4 Sig: 0.048		

Source: own calculations

Explanations:

- 1) Question: Imagine yourself in this situation. You have been paid \$5000 in cash for work that you have done outside your regular job. You don't declare it on your income tax return.
- 2) Question: Why do you think people work for cash-in-hand payments? By cash-in-hand we mean cash money that tax is not paid on.
- 3) Figures in brackets represent the number of respondents.

In Tables 5 to 7, the findings of other important attitudinal and socio-demographic variables are shown. Table 5 presents the findings from those people who are engaged in shadow economy work and clearly shows that, on average, cash economy workers have considerably lower ‘official’ incomes than those not working in the shadow economy (mean difference is AUS\$4100 or 85% of a non-cash economy worker’s income). However, this may be explained by the fact that shadow economy workers are considerably younger than non-shadow economy workers (average age is 38.3 years versus 48.6 years respectively), with an average of 10.4 years separating them.

Table 5: Other significant differences between shadow economy suppliers and non-suppliers

Variable/Attitude	Shadow economy supply	Sample (N)	Mean	<i>Standard Deviation</i>	<i>Mean Difference</i>	t-value¹⁾
Official income (AUS\$’000)	Supply	115	24.20	17.60	-4.10	-2.29*
	No supply	1724	28.30	27.80		
Age	Supply	117	38.30	13.40	-10.40	-8.02**
	No supply	1838	48.60	15.30		
In conflict with Tax Office (self)	Supply	118	2.11	1.00	0.12	1.69
	No supply	1845	1.99	1.00		
In conflict with Tax Office (other)	Supply	111	2.18	1.00	0.19	2.04*
	No supply	1796	1.99	1.00		
Has had contact with Tax Office	Supply	110	2.30	1.00	0.31	3.55**
	No supply	1795	1.99	1.00		
I should honestly declare cash earnings	Supply	118	3.11	0.75	-0.48	-6.81**
	No supply	1828	3.59	0.68		
I think others believe they should honestly declare cash earnings	Supply	115	2.45	0.57	-0.21	-4.07**
	No supply	1828	2.66	0.61		
It is smart to work in the cash economy	Supply	118	3.19	0.98	0.58	6.34**
	No supply	1813	2.61	0.85		
Disapproves of working in the cash economy	Supply	118	1.70	0.78	-0.45	-6.08**
	No supply	1808	2.16	1.03		
Has a smart tax agent	Supply	82	3.04	0.74	0.25	2.95**
	No supply	1169	2.79	0.63		

¹⁾ t-test for equality of means; equal variances not assumed, for further explanation see Table 7.

Not surprisingly, shadow economy workers have had significantly more contact with the Tax Office and are closely connected with people who have had conflict with the Tax Office (see Table 7 for description of the measures used). In addition, compared to non-shadow economy workers, shadow economy workers believe that they should be much less honest in declaring cash earnings and they are more likely to believe that others agree with them.

A similar result was found when measuring the attitude ‘it is smart to work in the shadow economy’. Shadow economy workers endorsed this attitude more strongly than non-shadow economy workers. Further, in contrast to non-shadow economy workers, shadow economy workers disapprove much less of others working in the shadow economy. Interestingly, those involved in the shadow economy are also more likely to have a ‘smart’ tax agent – one who is creative, seeks out tax loopholes and exploits the grey areas of the law, so in more ways than one, these people are seeking to reduce their tax obligations.

Table 6 presents the results for those who purchase shadow economy activities compared to those who do not. It is clear that results of these two groups are similar in some respects. For instance, when examining the age variable, no significant difference is found between those who purchase shadow economy work and those who do not (48.45 years versus 47.82 years respectively). Interestingly, no difference emerged between the two groups in answer to the attitude question ‘I should honestly declare cash earnings’. This is in contrast to the finding for the shadow economy suppliers (see Table 5). There was also no difference between people purchasing shadow economy work and those who do not in relation to the variable ‘has a smart tax agent’.

One important difference found between purchasers and non-purchasers was that those purchasing shadow economy work had considerably higher incomes than those not purchasing shadow economy work (on average 50.6% higher). Moreover, purchasers of shadow economy work differed from non-purchasers with respect to three attitudes:

- purchasers of shadow economy work were more likely to think that other people believed it was acceptable to earn money in the shadow economy;
- purchasers saw shadow economy workers as smart; and
- purchasers were not about to criticise shadow economy workers for their activities.

Table 6: Other significant differences between shadow economy purchasers and non-purchasers

Variable/ Attitude	Shadow economy purchase	Sample (N)	Mean	Standard Deviation	<i>Mean Difference</i>	t- value¹⁾
Official income (AUS\$'000)	Purchase	267	39.21	33.97	13.18	6.05**
	No purchase	1564	26.03	25.48		
Age	Purchase	280	48.45	13.62	0.63	0.69
	No purchase	1664	47.82	15.67		
In conflict with Tax Office (self)	Purchase	280	2.13	1.00	0.19	3.16**
	No purchase	1675	1.98	1.00		
In conflict with Tax Office (other)	Purchase	272	2.22	1.00	0.25	3.72**
	No purchase	1626	1.97	1.00		
Has had contact with Tax Office	Purchase	272	2.17	1.00	0.19	3.49**
	No purchase	1623	1.98	1.00		
I should honestly declare cash earnings	Purchase	276	3.50	0.77	-0.07	-1.45
	No purchase	1661	3.57	0.67		
I think others believe they should honestly declare cash earnings	Purchase	278	2.50	0.59	-0.16	4.32**
	No purchase	1659	2.66	0.61		
It is smart to work in the cash economy	Purchase	277	2.86	0.87	0.25	4.47**
	No purchase	1646	2.61	0.87		
Disapproves of working in the cash economy	Purchase	276	1.86	0.88	-0.32	-5.47**
	No purchase	1642	2.18	1.03		
Has a smart tax agent	Purchase	210	2.84	0.63	-0.04	0.74
	No purchase	1033	2.80	0.64		

¹⁾t-test for equality of means; equal variances not assumed, for further explanation see Table 7.

**Table 7: Composition of the attitude variables used in Tables 5 and 6 and Tables 8 to 10→
Part 1**

<i>Variable</i>	<i>Composition</i>
In conflict with Tax Office (self)	This measure was a composite of responses to a four-item scale asking if respondent had been audited, fined, questioned by the Tax Office, or had contested an assessment by the Tax Office. The response categories were: 1 = never in conflict ➡ 2 = once in conflict ➡ 3 = more often
In conflict with Tax Office (other)	This measure was a composite of responses to a two-item scale asking if some one close to the respondent had been audited by the Tax Office, or had contested an assessment by the Tax Office. The response categories were: 1 = never in conflict ➡ 2 = once in conflict ➡ 3 = more often
Has had contact with Tax Office	This measure was a composite of responses to a four-item scale asking if respondent or someone close to the respondent had requested information from the Tax Office. The response categories were: 1 = no contact ➡ 2 ➡ 3 ➡ 4 ➡ 5 = some contact
I should honestly declare cash earnings	This measure was a composite of responses to a four-item scale labelled a personal ethical norm of honesty in taxpaying. The response categories were: 1 = NO! ➡ 2 = no ➡ 3 = don't know ➡ 4 = yes ➡ 5 = YES!
I think others believe they should honestly declare cash earnings	This measure was a composite of responses to a four-item scale labelled a social ethical norm of honesty in taxpaying. The response categories were: 1 = NO! ➡ 2 = no ➡ 3 = don't know ➡ 4 = yes ➡ 5 = YES!
It is smart to work in the cash economy	This measure was a composite of responses to a three-item scale labelled admiration of cash-economy tax evasion. The response categories were: 1 = highly unlikely ➡ 2 ➡ 3 ➡ 4 ➡ 5 = highly likely
Disapproves of working in the cash economy	This measure was a composite of responses to a two-item scale labelled willingness to criticise cash economy workers. The response categories were: 1 = highly unlikely ➡ 2 ➡ 3 ➡ 4 ➡ 5 = highly likely
Has a smart tax agent	This measure was a composite of responses to a three-item scale asking respondents how much priority they would place on finding a tax agent who could use loopholes in the law and schemes to reduce the tax they have to pay. The response categories were: 1 = strongly disagree ➡ 2 = disagree ➡ 3 = neither ➡ 4 = agree ➡ 5 = strongly agree

In general, the results demonstrate that there are significant differences between the attitudes of people engaged in the shadow economy and those who are not. The next section will attempt to explain what influences people to become engaged in the shadow economy.

3. A preliminary explanation of the factors which motivate individuals to work in the shadow economy

For an individual to be engaged in shadow economy activities (either as a purchaser or supplier), several factors play a role. A number of variables have been hypothesised below that could influence the decision:

1) The income situation. It would be expected that as income increases, the purchase for and supply of shadow economy activities would be less; hence a negative correlation seems likely. This hypothesis is based on an assumption that as income increases, the need to operate in the shadow economy decreases. However, human aspiration may drive this relationship more than income adequacy. It could be the case that shadow economy workers compare their income situation with their neighbours, want to have a better life, and hence increase their shadow economy activities. Thus a positive correlation would also seem plausible.

Research findings on tax evasion more generally reflect the ambiguity conveyed in Hypothesis 1 (Andreoni, Erard, and Feinstein, 1998; Jackson and Milliron, 1986). Mixed results have led some researchers to turn their attention to subjective assessments of income adequacy and compliance costs as outlined below in hypothesis 2.

2) If people feel burdened by the demands of the state (for example, high income tax, red tape, other costs, lack of disposable income) they will be more likely to be engaged in shadow economy activities.

The burden of taxation has been a standard explanation for the rise of the shadow economy (Alm, Sanchez, and de Juan, 1995), but empirical findings in support of this assertion are far from conclusive (Jackson and Milliron, 1986). Often this hypothesis has been tested using objective indicators such as marginal tax rates without considering the importance of taxpayer perception in understanding taxpayer motives. Behaviour is more

likely to be affected if taxpayers perceive themselves as carrying a burden, that is, through an awareness that they have insufficient disposable income, that they are paying a lot of tax and that they have extra costs associated with meeting their tax obligation. The attitudinal measures of perceptions of tax burden is described in Table 7.

- 3) People engaged in shadow economy activities know that if they are caught by the authorities they will be punished; hence people who believe that the likelihood of being detected is high will be less likely to engage in shadow economy activities.

Perception of the likelihood of detection has been one of the most consistent predictors of tax evasion (Andreoni, Erard, and Feinstein, 1998; Jackson and Milliron, 1986).

- 4) If people feel a high moral obligation to pay their taxes, they will be less likely to be engaged in shadow economy activities.

Along with perception of the likelihood of detection, feeling a moral obligation to pay tax has emerged as a major factor in understanding tax compliance (Grasmick and Bursik, 1990; Scholz and Pinney, 1995; Schwartz and Orleans, 1967). Having internalised the belief that paying tax is the right thing to do, a person can be said to have a conscience about paying tax. Once activated, conscience serves as a self-regulatory mechanism that delivers voluntary compliance (Ahmed, Harris, Braithwaite, and Braithwaite, 2001).

- 5) Those people who are in conflict with the Tax Office are more likely to be engaged in shadow economy activities. The same holds for those who have a lot of contact with the Tax Office.

Research findings on contact with a tax enforcement agency have produced mixed results (Andreoni, Erard, and Feinstein, 1998; Jackson and Milliron, 1986). Most of this work is based on the Internal Revenue Service in the United States so a comparison of the findings to other tax authorities needs to be approached with caution. In theory, it could be expected that individuals who had frequent contact with a regulatory agency, and who had conflict with that agency, would include people who are engaged in shadow economy activities. From the perspective of effective regulation, it could be argued that a tax

authority that was targeting risk satisfactorily should have more contact and conflict with those at the margins or beyond the bounds of legally sanctioned behaviour.

- 6) Those who feel they should honestly declare all cash earnings will be less likely to be engaged in shadow economy activities. Also, those who believe that other people feel the same way, that is, that they should honestly declare all shadow economy activities, will be less likely to be engaged in shadow economy activities.

Personal and social norms are increasingly being examined as explanatory factors in the context of tax compliance (Alm, Sanchez, and de Juan, 1995). An individual's understanding of what he or she should do in a particular situation, that is, should they declare all cash earnings, describes a personal norm. The individual's understanding of what others believe about this same practice, that is, do others believe they should declare all their cash earnings, represents a social norm. Personal and social norms are expected to positively reinforce each other, but need not be of the same magnitude in a community. In Australia, the personal norm of honestly declaring cash earnings is stronger than the corresponding social norm (see Braithwaite, Reinhart, Mearns, and Graham, 2001). Individuals are most likely to say that they personally believe in being honest about declaring all cash earnings, but they don't think other people share this view. Therefore, both personal and social norms are tested as predictors of cash economy activities.

- 7) Those who think that people engaged in shadow economy activities are smart will be more likely to be engaged in shadow economy activities themselves.

Personal and social norms represent community perceptions of what is socially acceptable behaviour. They play a central part in shaping an individual's identity. Just as influential are the actions of groups that the person respects and admires. Such groups may not follow socially accepted customs. Nevertheless, they may offer an identity that appeals to people, particularly those people who are frustrated with more socially accepted ways of operating (Sutherland and Cressey, 1978). Prerequisites for identifying with a group engaged in cash economy activities and subsequently taking part in such activities oneself, are likely to be respect for group members and loyalty to that group (Tyler and Blader, 2000). Hypothesis 7 addresses the issue of respect through the belief

that cash economy workers are smart. Hypothesis 8 addresses the issue of loyalty through being unwilling to criticise or blow the whistle on those working in the cash economy.

- 8) Those people who disapprove of others working in the shadow economy will be less likely to be engaged in shadow economy activities.

While the variables presented in hypotheses 1 to 8 have been specifically proposed, other factors such as age, education, occupation, gender, marital status, and number of children may also predict whether people become involved in the shadow economy.

Table 8 presents the results of a logistic regression which attempts to explain whether or not an individual will engage in the shadow economy. The dependent variables are as follows:

- 1 working in shadow economy activities (suppliers, n=78)
- 0 not working in shadow economy activities (non-suppliers, n=1154)

and

- 1 purchasing shadow economy activities (purchasers, n=200)
- 0 not purchasing shadow economy activities (non-purchasers, n=1025)

The independent variables are the factors mentioned in Hypotheses (1) to (8) in addition to the socio-demographic variables listed in Table 8.

**Table 8: Results of a logistic regression for people engaged in shadow economy activities
Part 1**

Independent Variables	Estimated coefficients b value (Wald test)	
	Dependent Var: Suppliers of shad.ec.act. ^a	Dependent Var: Purchasers of shad.ec.act. ^b
Moral obligation to pay tax 1=strongly disagree 5=strongly agree	0.06 (0.05)	0.21 (1.74)
Chances of getting caught 1=about zero % 5=about 100 %	-0.23 (4.02)*	-0.28 (15.86)**
Working for cash-in-hand to reduce government costs 1=definitely not 5=definitely	-0.08 (0.11)	0.32 (3.90)*
Paying cash-in-hand to reduce government costs 1=definitely not 5=definitely	0.34 (3.62)	-0.28 (7.49)**
In conflict with the Tax Office (self) 1 = never in conflict 3 = mostly in conflict	0.46 (6.20)*	0.02 (0.02)
In conflict with the Tax Office (other) 1 = never in conflict 3 = mostly in conflict	0.04 (0.08)	0.09 (0.78)
Has had contact with the Tax Office 1 = little contact 3 = most contact	0.24 (1.90)	0.03 (0.09)
I should honestly declare cash earnings 1 = NO!! 5 = YES!!	-0.67 (8.78)**	-0.11 (0.61)
I think others believe they should honestly declare cash earnings 1 = NO!! 5 = YES!!	-0.50 (4.20)*	-0.16 (1.17)
It is smart to work in the cash economy 1 = highly unlikely 5 = highly likely	0.09 (0.13)	0.44 (12.90)**
Disapproves of work in the cash economy 1 = highly unlikely 5 = highly likely	-0.17 (0.81)	0.01 (0.01)

*p<0.05; **p<0.01

^a Prior probability of classification was set to 0.06 according to the sample distribution.

^b Prior probability of classification was set to 0.144 according to the sample distribution.

**Table 8: Results of a logistic regression for people engaged in shadow economy activities
Part 2**

Independent Variables	Estimated coefficients b value (Wald test)	
	Dependent Var: Suppliers of shad.ec.act.	Dependent Var: Purchasers of shad.ec.act.
<i>Income and socio-demographics</i>		
Personal income per thousand AUS\$	-0.02 (8.82)**	0.01 (8.50)**
Age	-0.03 (7.34)**	0.01 (0.52)
Education^a	8.25	7.41
(1. Leaving, year10)		
2. Matriculation	0.84 (3.16)	0.31 (0.99)
3. Trade, nursing diploma	0.99 (3.90)*	0.45 (1.88)
4. Diploma course	1.37 (7.21)**	0.82 (6.34)*
5. University, tertiary	1.35 (6.11)*	0.68 (4.26)*
6. Post graduate	1.21 (2.08)	0.78 (3.69)
Occupation^a	9.26	10.39
(1. Professionals)		
2. Managers	-0.24 (0.16)	-0.41 (2.02)
3. Associate professionals	-0.14 (0.07)	-0.21 (0.54)
4. Trade clerical	0.87 (3.73)	-0.13 (0.18)
5. Intermediate trade clerical	0.24 (0.26)	-0.48 (2.50)
6. Intermediate production, transport	0.11 (0.02)	-0.93 (3.42)
7. Elementary clerical	0.79 (1.75)	-1.82 (5.77)*
8. Labourer	-0.18 (0.06)	-0.64 (1.43)
Gender Female = 0, male = 1	0.83 (7.25)**	-0.38 (3.90)*
Marital status Not married = 0, married = 1	0.42 (1.58)	0.83 (12.28)**
For whom are you working^a	6.71*	5.33
(1. Private company)		
2. University, government	-0.64 (3.53)	0.01 (0.01)
3. Own business	0.43 (1.38)	0.54 (4.68)*
How many children do you have living with you at home	-0.13 (1.02)	-0.02 (0.04)
Child support No child support = 0, child support = 1	-0.03 (0.01)	-0.57 (1.30)

*p<0.05; **p<0.01

^aThe first response category was omitted in the formation and calculation of the dummy variables but can be found in brackets for explanatory purposes.

**Table 8: Logistic regression results
Part 3**

Classification table for shadow economy supply activities

Observed	Predicted		
	Supply economy activity		Percentage Correct
	No	Yes	
<i>Shadow ec.</i> <i>No</i>	857	297	74.3
Yes	15	63	80.8
Overall Percentage			74.7

Nagelkerke $R^2 = .27$

Chi-square = 130.57**

Classification table for shadow economy purchase activities

Observed	Predicted		
	Purchase economy activity		Percentage Correct
	No	Yes	
<i>Shadow ec.</i> <i>No</i>	631	394	61.6
Yes	45	155	77.5
Overall Percentage			64.2

Nagelkerke $R = .21$

Chi-square = 163.41**

Logistic regression - dependent variables:

- 1) People working in the shadow economy (suppliers) = 1
 People not working in the shadow economy (non-suppliers) = 0
- 2) People purchasing shadow economy activities (purchasers) = 1
 People not purchasing shadow economy activities (non-purchasers) = 0

If we examine the overall explanatory validity of these two logistic regressions, we get a Nagelkerke R^2 of 0.27 for supplying shadow economy activity and R^2 of 0.21 for purchasing shadow economy activity; that is 27% and 21% of the variance of the dependent variables are explained, respectively, by the predictors. For those who work in the shadow economy, we can correctly predict 80.8% of cases, and 74.3% of cases for those not working in the shadow economy. For those who purchase cash economy work, we can correctly predict 77.5% and 61.6% of those not purchasing cash economy work. Overall, for shadow economy suppliers we can predict 74.7% of all cases correctly, and 64.2% for shadow economy purchasers. While these results are promising, the regression models must be improved to raise predictive capacity for shadow economy workers and those who purchase services.

If we now examine the independent variables and their relationship to the dependent variable of interest, some hypotheses are confirmed while others not. The variables ‘moral obligation to pay taxes’ and ‘disapproval of cash economy work’ had no statistically significant influence on shadow economy supply or demand. In contrast, the variable ‘chances of getting caught’ did have the expected statistically significant influence on shadow economy workers and those who purchase shadow economy work: those engaged in the shadow economy estimated their chances of being caught as lower than non-participants.

The likelihood of working in the cash economy was also lower if one accepted the personal norm of being honest in declaring cash earnings, as well as the social norm of perceiving others as feeling the same way. Although these variables did not affect demand, it is interesting that purchasers of cash economy work thought of cash economy workers as smart operators.

Having had conflict with the Tax Office was associated with working in the cash economy, but not with purchasing shadow economy work. Believing that government demands were excessive also played a role, but in an unexpected way. Purchasers were more likely to deny that they purchased cash economy work so that they could reduce costs and avoid government red tape. They were more likely to attribute cash economy activity to workers believing that their tax was too high, that they were lacking disposable income, and wanting to avoid paying tax. If anything, they tended to blame purchasers for wanting to cut costs, although the b coefficient was just short of statistical significance at the 0.05 level ($p = 0.055$). These data suggest that a process of ‘neutralisation’ as described by Thurman, St. John, and Riggs (1984) may be in play here, with each group blaming the other for their own participation in illegal activities. Further work is being planned to unravel the social processes leading to these results.

An increase in income appeared to reduce shadow economy supply (that is, work in the shadow economy decreases), but increased the purchase of shadow economy activities—a result not consistent with our income hypothesis. The results also show that as people aged, they tended to work less in the shadow economy. Men worked more in the shadow economy than women (statistically significant) but women purchased more shadow economy activities (statistically significant). Those who were married were more likely to be purchasers in the shadow economy. The number of children one had and whether one had to pay child support

had no influence on shadow economy activities. There was some evidence that self-employed people and those with their own businesses were more likely to be engaged in the cash economy, but the results were surprisingly weak when other variables were entered into the equation. Similarly, people in some educational categories (for example, trade, diploma or university qualifications) were more likely to be engaged in cash economy activities, but overall, the effects for education and occupation were not significant.

Table 9 explains which variables predict the amount of cash money earned in the shadow economy while Table 10 explains which variables predict the amount of cash money spent in the shadow economy. For these analyses, the same variables were used as in the logistic regressions with four additional variables (see Table 7 for a description of these variables). The first, wanting an honest tax agent, was introduced because tax agents are more likely to be useful to cash economy participants as the amount of money involved increases. The prediction was that engagement in the cash economy would be negatively correlated with wanting an honest tax agent. The second and third variables measured satisfaction with one's material well-being, to complement the objective measure of income that had already been included in previous analyses. Finally, the model included the type of work done in the shadow economy. In each case, for suppliers and purchasers, the ordinary least squares regression analysis was based on the sub-sample who were active in the shadow economy. To preserve degrees of freedom, the final models contained a subset of variables that best contributed to explaining variation in the amount of money earned and spent in the shadow economy.

To maximise comparability between the regression models for suppliers and purchasers the following were selected as the most useful common predictors: the socio-demographic variables of income, number of children, education and employment sector, and the social-psychological variables of wanting an honest tax agent and being unable to get ahead because of the tax system.

Table 9: Regression (OLS) results predicting amount of cash income among shadow economy suppliers from a set of best predictors (N = 118)

Independent Variables	B value	beta value	t value
Official income	59.92	.24	2.96**
How many children	592.57	.16	1.95*
Education^a			
(1. Leaving, year 10)	-2293.62	-.23	-1.73
2. Matriculation	-3396.06	-.30	-2.49*
3. Trade, nursing diploma	-1827.56	-.18	-1.40
4. Diploma course	-2508.20	-.24	-1.75
5. University, tertiary	-3274.09	-.16	-1.56
6. Post graduate			
For whom are you working^a			
(1. Private company)	59.57	.01	0.06
2. University, government	2403.22	.22	2.52*
3. Own business			
Wanting to have an honest tax agent	-1840.46	-.33	-3.97**
Being unable to get ahead because of the tax system	66.60	.01	0.16

^aThe first response category was omitted in the formation and calculation of the dummy variables but can be found in brackets for explanatory purposes.

R² = .32; F = 4.52**

Higher cash earnings were reported by those having more children, a higher official income, less education, and being self-employed and the owner of a business. Those earning more in the cash economy also wanted a tax agent who was less than honest. The overall F-test was statistically significant, $F=4.52$, $p < 0.001$, although only 32% ($R^2 = 0.319$) of the variation in amount of cash money earned could be explained by these variables together.

Table 10 presents the results for the money spent on shadow economy activities. Official income is positively related to the amount of money spent on shadow economy activities, as is feeling materially disadvantaged by the tax system, and having less education. Spending money in the cash economy is also related to not wanting an honest tax agent. Only 15% ($R^2 = 0.146$) of the variation (see Table 10) in the amount of money spent in the shadow economy could be explained, although again the model was statistically significant ($F = 4.21$, $p < 0.001$). Given that the overall fit is poor, both regressions need to be improved before any firm conclusions can be made about the results.

Table 10: Regression (OLS) results predicting amount of cash income among shadow economy purchasers from a set of best predictors (N = 283)

Independent Variables	<i>B value</i>	beta value	t value
Official income	69.30	0.22	3.71**
How many children	749.37	0.09	1.49
Education^a			
(1. Leaving, year10)	-5042.18	-0.19	-2.43*
2. Matriculation	-5145.08	-0.17	-2.33*
3. Trade, nursing diploma	-5674.62	-0.21	-2.70**
4. Diploma course	-5329.79	-0.23	-2.66**
5. University, tertiary	-4812.43	-0.15	-1.99*
6. Post Graduate			
For whom are you working^a			
(1. Private company)			
2. University, government	-1121.82	-0.05	-0.77
3. Own business	-1685.29	-0.06	-1.01
Wanting to have an honest tax agent	-2056.16	-0.13	-2.15*
Being unable to get ahead because of the tax system	1550.49	0.14	2.50*

^a The first response category was omitted in the formation and calculation of the dummy variables but can be found in brackets for explanatory purposes.

$R^2 = .15$; $F = 4.21^{**}$

4. A preliminary attempt to calculate aggregate figures of the Australian shadow economy⁶

Section 2 presented income figures of individuals who work in the shadow economy. A preliminary attempt can be made to use these income figures to calculate an aggregated figure of the shadow economy income earned in Australia. The procedure and results of this attempt are shown in Table 11 (part 1 and 2). It should be noted that in order to estimate an aggregated figure of the shadow economy in Australia, a number of assumptions have to be made. These assumptions include how many people are working in the shadow economy, how one treats the unemployed and how one treats those who retire early. Consider the officially employed workforce first. By grouping them using Australian Bureau of Statistics categories (such as labourers, managers and administrators), and then assuming that they are engaged in shadow economy work, an overall figure of AUS\$17.563 billion or 2.86% of gross national income⁷ (GNI) being earned through the shadow economy can be estimated. However, this figure does not include the unemployed or those who have retired early (55 to 65 years of age).

⁶ One of the few and latest studies estimating the underground economy in Australia has been done by Christopher Bajada (1999). Bajada uses the currency demand approach, over the period 1967 – 1995, not the micro estimates method used here to estimate the Australian shadow economy.

⁷ Gross national income (GNI) represents the sum of all income of residents arising from economic activity. It is equivalent to gross domestic product (GDP) less the consumption of fixed capital less net income paid overseas. It is also equivalent to domestic factor incomes plus indirect taxes, less subsidies, less net income paid overseas. (Castles, 1990 p8).

Table 11: Some basic calculations of an aggregate figure of the shadow economy in Australia for the year 2000

Part I

Occupation	<i>Questionnaire Sample</i>				Number of officially employed people ('000s)	Total amount of shadow income earned in '000 (AUS\$)	Total shadow economy income (%)
	Number of people working in the shadow economy (1)	Number of people <i>not</i> working in the shadow economy (2)	(1)/(2) in %	Mean income earned in the shadow economy (AUS\$)			
<i>Managers and administrators</i>	7	185	0.04	1 267.14	643.50	815 404.59	
<i>Professionals</i>	18	363	0.05	1 535.00	1 646.20	2 526 917.00	
Associated professionals	10	206	0.05	3 670.00	1 037.90	3 809 093.00	
Trade, clerical	24	217	0.11	3 478.13	1 588.00	5 523 270.44	
Intermediate trade, clerical	12	278	0.04	1 360.00	1 599.90	2 175 864.00	
<i>Intermediate production transport</i>	4	123	0.03	1 937.50	776.70	1 504 856.25	
Elementary clerical	8	108	0.07	931.25	911.20	848 555.00	
<i>Labourers</i>	4	94	0.04	424.75	846.10	359 380.98	
Total				14 603.77	9 049.50	17 563 341.26	2.86%
Average				1 825.47			

Table 11: Some basic calculations of an aggregate figure of the shadow economy in Australia for the year 2000

Part 2

Variable	Number of unemployed and early retired pensioners	Mean Y Shadow Ec. (AUS\$) ¹⁾	Mean Y Shadow Ec. DOUBLE (AUS\$)	Mean Y Shadow Ec. TRIPLE (AUS\$)	Shadow economy income of the unemployed and early retired pensioners (AUS\$)	Shadow economy income of the unemployed and early retired pensioners DOUBLE (AUS\$)	Shadow economy income of the unemployed and early retired pensioners TRIPLE (AUS\$)
	5 625 700.00	2 135.31	4 270.62	6 405.93	12 012 613 000.00	24 025 227 000.00	36 037 840 000.00
Shad. Ec. Y of the workers					+17 563 341 000.00	+17 563 341 000.00	+17 563 341 000.00
Total Shad. Ec. Y					29 575 954 000.00	41 588 568 000.00	53 601 181 000.00
					Shad.Ec.Y in % of GNI	Shad.Ec.Y in % of GNI	Shad.Ec.Y in % of GNI
					4.81%	6.77%	8.73%

¹⁾Value from Table 1 was taken because it represents a larger sample of shadow economy suppliers (101 versus 87 from Table 11 part 1).

By combining the unemployed and those who have retired early, there are 5 625 700 people who could potentially work and earn in the shadow economy. This poses a problem when trying to estimate how much these people can work and earn. As these groups have more time on their hands, they have the ability to work more. Hence, the absolute minimum figure they could earn is the same as the shadow economy income earned by those who are officially employed. These two groups might also earn double or triple the amount of cash income than those who are officially employed - estimates are presented in Table 11. All three of these possibilities may be plausible. Assuming that the unemployed and those who have retired early have the same shadow economy income as those who are officially employed, an aggregated figure of AUS\$29.575 billion (or 4.81% of official GNI) being earned by these two groups can be calculated. Assuming they earn double the cash income of those officially employed, an aggregate figure of AUS\$41.588 billion (or 6.77% of official GNI) can be obtained. Finally, assuming these two groups of people earn triple the amount of cash income of those officially employed, we get an aggregate figure of AUS\$53.601 billion (or 8.75% of official GNI).⁸

To get an overall indication of how much is being earned in the Australian shadow economy, add the amount of shadow economy income earned from small and medium sized enterprises to these aggregated figures. An overall estimate of the shadow economy work being conducted in Australia was calculated using the currency demand approach (see Schneider & Enste, 2000) and the value was found to be approximately 14.2% of GNI. While the aggregate results presented in this section seem plausible, it should be noted that the assumptions made could be criticised and the results should be accepted with caution.

⁸ Bajada's estimate of the size of the underground economy in percent of GDP for the year 1995 was 15.5% and for the year 1994, 15.2%. Using a different method his estimates are much larger than the one obtained here for the year 1999/2000.

Summary and policy conclusions

This paper provides an explanation of the individual behaviours which motivate people to engage in the cash economy. Socio-demographic variables were important, along with threat of legal sanctions and perceptions of social norms. The findings support the conclusion that Alm, Sanchez, and de Juan (1995) reached on the basis of their experimental work: There is considerable diversity in the behaviour of taxpayers motivated by ‘myriad factors ... that go much beyond the standard economics-of-crime approach’ (p. 15).

Overall, the results presented in this paper showed that a shadow economy worker earned, on average, AUS\$2135.31 in 2000 and households spent AUS\$2293.00 for shadow economy activities in 2000. Results also showed that people engaged in shadow economy work as a supplier or purchaser are convinced that the probability of being caught is considerably lower than those not engaged in such activities. In addition, involvement in the cash economy is associated with views about tax being too high, and red tape and government charges being cumbersome. Interestingly, purchasers tended to attribute these motives to suppliers, and suppliers to a lesser extent, to purchasers, but neither group owned these attitudes themselves. Those working in the shadow economy were less likely to place importance on being honest when declaring their cash earnings, while purchasers thought shadow economy workers were smart and should not be criticised for their activities. The results also showed that if others are seen to be supportive of the shadow economy then this is likely to increase such activities (that is, ‘if everyone else does it, I might as well do it too’). The above findings were supported empirically with a logistic regression analysis when using the dichotomous dependent variable (not engaged =0, or engaged =1, in the shadow economy).

Finally, by using the data collected in the survey, an overall aggregate figure was calculated to estimate the degree of income earned in the cash economy in Australia for the year 2000. It was estimated that between 4.81% and 8.8% of GNI was earned through these illegal activities. Overall, it should be noted that this paper presents preliminary findings from the Community Hopes, Fears and Actions Survey and should only be seen as an initial explanation of the motivating factors responsible for why people engage in shadow economy activities.

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