

UNDERGROUND PRODUCTION

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8. UNDERGROUND PRODUCTION

8.1. Introduction

8.1. The first seven chapters of this Handbook focus on producing exhaustive estimates of GDP and its components, including methods for assessing and remedying deficiencies in the basic data collection programme and in the national accounts. This chapter and the three that follow are devoted to analysis and measurement of underground production, illegal production, informal sector production and household production undertaken for own final use. Each of these is viewed as being of intrinsic interest in its own right. None of them are reduced by better measurement of GDP.

8.2. As previously noted, there can be overlap between these groups of productive activities – they are not mutually exclusive. In particular, production may be both informal sector and underground. This chapter deals with those production activities that are underground without consideration of whether or not they are informal sector. The breakdown of activities into formal, informal sector, and household production undertaken for own final use according to the type of enterprise responsible for them is another dimension that is discussed in Chapters 10 and 11.

8.3. Up to this point in the Handbook, the term *underground economy* has been interpreted strictly in accordance with the definition provided by the 1993 SNA. However, the term has much broader application outside the context of the national accounts. It is in common use by sociologists, labour market analysts, lawmakers, the media and the public at large. The various meanings it is given depend upon the different perspectives and preoccupations of the users. Section 8.2 explores some of these meanings and their relationship to the 1993 SNA definition. It also refers to some of the other terms that are used as synonyms, or are closely related. Reference is made to some non-productive activities that are sometimes (but inappropriately) associated with the underground production to explain the sense in which they are not productive and how they can be viewed. Section 8.3 brings together various methods for measurement of the underground economy. Section 8.4 deals with the definition and measurement of some particular types of phenomena including tax evasion, cross border shopping and shuttle trade.

8.2. Alternative Meanings, Synonyms and Closely Related Terms

Definition of underground production

8.4. As previously noted in Chapter 3, the 1993 SNA defines the underground economy as all legal production activities that are deliberately concealed from public authorities for the following kinds of reasons:

- to avoid payment of income, value added or other taxes;
- to avoid payment of social security contributions;
- to avoid having to meet certain legal standards such as minimum wages, maximum hours, safety or health standards, etc;
- to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.

8.5. It is important to recognise that this is not a definition that is commonly understood or strictly observed outside a fairly narrow circle of national accountants and economists. There are a variety of other different but valid meanings of the term, each reflecting the particular perspective of the users. Much confusion can arise because the various senses in which the term is used are not always recognised as being different. The following paragraphs outline some of the alternative definitions in common use, and the distinctions between them.

Inappropriate inclusion of non-productive activities

8.6. The first and most common cause of confusion in the meaning of underground economy occurs because it is sometimes presumed to include activities that are underground in the sense that they involve concealment from taxation or other authorities, but that are **not** productive. Examples are illegally exported capital or concealed interest income or capital gains. These activities may be underground in a loose sense of the word, but they should not be considered as underground *production* and thus part of the underground economy, given that the only broadly accepted notion of production is the one defined by the 1993 SNA. Not all monetary transactions are productive and conversely not all productive activities are monetary. It is important to recognise the distinction.

Inclusion/exclusion of illegal production

8.7. Another source of ambiguity in meaning is whether or not the underground production is deemed to include illegal activities. Of course, according to the 1993 SNA it does not. However, whilst the 1993 SNA is definitive in deciding what is production, it does not have a monopoly on the meaning of the term “underground”. From the perspective of tax law enforcement, for example, the legality of the production activities is not the issue. The issue is the deliberate concealment of productive (and non-productive) activities that should be declared to the tax authorities. Thus, on occasions in the literature, the “underground economy” covers both legal and illegal concealed production without distinguishing between them. Whilst this is a source of confusion and better avoided, it is understandable.

8.8. If illegal production is separated from underground production in accordance with the 1993 SNA definitions, the boundary between the two must be delineated. As noted in the 1993 SNA and in Chapter 3, and as further discussed in Chapter 9, there are some difficulties with marginal cases.

Inclusion/exclusion of small-scale market production

8.9. A third cause of confusion arises in connection with market production activities that are on such a small scale that the enterprises responsible for them are not obliged or expected to report them to the public authorities. Even though these activities are outside the 1993 SNA definition of underground production because they do not involve any deliberate concealment, they may be included within the scope of underground production in some studies.

Total, non-observed and non-measured underground production

8.10. Yet another source of ambiguity in meaning is whether the underground economy is taken to cover all concealed productive activities, or just those that are not included in the official GDP estimates. According to the 1993 SNA, the underground economy includes all underground activities whether measured or not, but the interpretation of underground economy as non-measured production is also common practice. In line with the terminology presented in Chapter 1, those productive activities that are underground may be more precisely referred to as *total underground production*, those that are not recorded in the basic data as *non-observed underground production* and those that are excluded from GDP estimates as *non-measured underground production*.

Underground production, untaxed production and untaxed income

8.11. Underground production is sometimes used in the sense of *untaxed* production, meaning production for which the corresponding income should be but is not reported to the tax authorities.

Thus defined, untaxed production is almost but not quite coincident with underground production according to the 1993 SNA definition as the latter includes concealment from other public authorities in addition to the tax authorities.

8.12. A more serious interpretation problem arises when underground economy is used in the context of *untaxed* income. Untaxed income cannot be directly related to untaxed production as taxable income may be generated by activities that are not productive. There is also an important distinction between untaxed production and non-measured underground production, which are sometimes confused, as noted by Tanzi (1999). The former relates to a shortfall in government revenues, the latter to a shortfall in GDP estimates.

Underground production in percentage terms

8.13. Another source of confusion arises in quoting the extent of underground activities in percentage terms. Typically percentages are defined on the basis of the ratio of the item of interest to the whole. In the context of the underground economy this would imply expressing underground production as a percentage of total production. However, underground production is often quoted as a percentage of the official GDP estimates rather than of total (official + underground) GDP. This difference becomes increasingly significant with increase in the size of the percentages.

Other terms

8.14. Van Eck (1987) lists nearly 30 terms that are used as synonyms for, or are closely related to, the underground economy. The list includes the following:

Alternate	Counter	Marginal	Peripheral	Twilight
Autonomous	Dual	Moonlight	Secondary	Unexposed
Black	Grey	Occult	Shadow	Unofficial
Cash	Hidden	Other	Submerged	Untaxed
Clandestine	Invisible	Parallel	Subterranean	Underwater
Concealed	Irregular			

8.15. These terms can all have different shades of meaning. One might hypothesise that *concealed economy* meant the same as underground economy, that *grey economy* covered underground and informal sector production, and that *invisible economy* might include illegal production as well, but this would be pure speculation. There is no way of knowing what any of the terms might mean in any particular document unless the authors have included definitions.

Summary

8.16. In conclusion, in the context of the national accounts, the appropriate definition of underground production is provided by the 1993 SNA. However, outside the immediate context of the national accounts there is no unique “correct” definition of underground and several variants are in use. Hence, as an author it is vital to specify the definition being used, and as a reader it is vital to check it. In this Handbook the 1993 SNA definition is applied.

8.3. Measurement Tools

8.3.1. Introduction

8.17. This section summarises the particular mechanisms that can be used to measure the underground economy. The primary tools are special surveys of underground production, labour, expenditure, and income. Another class of tools is business and household opinion surveys, and a third source of information is audit data and special studies carried out by the taxation authorities. The section builds on the material presented in Section 4.3 in connection with assessment of the national

accounts, the difference being that in Chapter 4 the goal was minimising non-measured production whereas here the focus is measuring underground production separately.

8.18. As previously noted, the results of surveys of underground activities must be interpreted very carefully, especially those focused on tax evasion. It is very likely that the non-response is selective because people who are involved in underground activities are more likely to refuse to co-operate than people who are not. Selective non-response is difficult to reduce or to adjust for. Moreover, attempts to reduce non-response may not necessarily improve the results. It may be impossible to persuade people to respond to sensitive questions, although some randomised response techniques are promising (see Landsheer et al, 1999). Too much effort to increase overall response may even reduce the reliability of the results. The challenge in surveying underground activities is to find the appropriate balance with respect to the risks of complete non-response, item non-response and incorrect response.

8.3.2. Surveys of Expenditure on Goods and Services from Underground Production

8.19. In some countries it is a criminal offence to make a payment without asking for a receipt, but in most countries purchasing goods and services from underground producers is not against the law. Thus surveys of expenditure on underground production are more likely to give good results than surveys of underground income. Expenditures reported in household consumption surveys are very likely to include underground expenditures but without distinguishing them from other expenditures. Some household surveys attempt to identify expenditures on underground production by asking respondents to indicate separately those purchases that they suspect may have an underground character. Others ask respondents to describe the type of outlet or seller from among a list that includes those types most likely to be operating underground, including street-traders, independent artisans (plumbers, gardeners, electricians, etc.) and farm shops.

8.20. For example, in a survey of the underground economy from the perspective of household consumers, the Hungarian Central Statistical Office (1998) asked the respondent:

- *How many times in the last month, and in 1997, have you or anyone in your household purchased the following personal services, what was the total amount spent and for what share was a receipt received?* – question followed by a list of personal services and boxes to enter the required data;
- *How many times in 1997 have you or anyone in your household purchased the following industrial, building and agricultural and other services, what was the total amount spent and for what share was a receipt received?* – question followed by a list of services and boxes to enter the required data;
- *For how long in the last year did you or anyone in your household purchase the following facilities, what was the total amount spent and for what share was a receipt received?* – question followed by a list of accommodation types and boxes to enter the required data;
- *How many times in the last month, and in 1997, did you or anyone in your household purchase the following products from a vendor or market seller, what was the total amount spent and for what share was a receipt received?* – question followed by a list of products and boxes to enter the required data;
- *How many times in the last month, and in 1997, did you or anyone in your household give a tip for the following services and what was the total amount spent?* – question followed by a list of personal services and boxes to enter the required data.

It should be noted that respondents find it difficult to recall information over a one year period.

8.3.3. Surveys of Labour Input and Income Associated with Underground Production

8.21. Experiences in Scandinavian countries (Isachsen and Strom, 1989 and Mogensen et al, 1995), in the USA (Smith, 1985), in Romania (Ivan-Ungureanu and Pop, 1996) and in the Netherlands (Van Eck and Kazemier, 1988) suggest that the labour market is another area where surveys of underground activities can be successful. First of all, involvement is quite widespread, so there is no difficulty in locating a sample. Secondly, working has such an impact on daily activities that it is readily remembered. Thirdly,

in many countries underground work is considered a minor infringement of the law and thus at least some of the workers are willing to report their activities.

8.22. As noted in Section 4.4, surveys of labour input to underground production can collect information on either demand or supply of labour.

8.23. Surveying supply of labour may provide more detail but needs careful design, involving questions that are sensitive and prone to item non-response and incorrect response. Van Eck and Kazemier (1992) describe a sequence of questions that gradually lead to underground activities. The key questions on underground activities are embedded in related but non-sensitive questions. Labour input to underground production is carefully introduced as a topic and the sensitive questions on participation in underground activities are towards the end of the question sequence. For example, the topic is foreshadowed by asking the respondent about opportunities and skills to earn some additional money. If the respondent acknowledges earning additional money further questions are asked about the kind of work, the time involved, and the hourly wage rate. Only after that is underground income introduced by asking opinions on the probability of detection if additional income is not reported to the tax authorities. Finally, it is suggested that all extra earnings are unreported, and it is assumed that this is the case unless this is explicitly denied by the respondent. In the research described, Kazemier and Van Eck noted there were seven places in their questionnaire where the respondent could deny underground activities. The result of their experiment (conducted in 1983) was that 12% of all respondents 16 years old and over admitted that they had been involved in underground activities in the previous year, earning a total underground income amounting to about 1% of GDP. This was twice as much as obtained by a survey with a conventional questionnaire in which questions about underground activities were asked directly.

8.3.4. Surveys of Time Use

8.24. Time use surveys can provide additional information about underground activities, as previously noted in Section 4.3. The advantage of the time use approach over labour force surveys is that it provides a framework for allocating all available time between productive and other activities. However, care must be taken to ensure that the relevant activities can be classified. It must be possible to distinguish between time spent working as an employee in an enterprise, and time spent as own account worker. It should also be possible to identify the kind of work carried out on own account in order to impute the amount of income likely to have been earned. Luttikhuizen and Oudhof (1992) provide more details.

8.3.5. Opinion Surveys

8.25. Opinion surveys of enterprises and households are used in several countries to monitor underground activities. As previously noted, they have several features that make them easier to manage than quantitative surveys. They can be designed to take very little time to complete. They can be addressed directly to senior managers who are likely to be well informed about underground activities in their own sector of activity. They can be made non-threatening by asking respondents to give their views about general practices in an industry or sector rather than asking respondents about their own particular underground activities. On the other hand, they do not provide quantitative information that can readily be used to make adjustments to GDP.

8.26. As an example, the Russian Federation Centre for Economic Analysis (2000) addressed questions along the following lines to retail trade enterprises. (Similar types of questions were addressed to enterprises in other branches.)

- Please estimate (in ranges < 5%, 6-15%, 16-30%, 31-50%, 51-70%, > 70%) the approximate shares of unregistered receipts by: *large and medium retailers; small retailers; individual entrepreneurs.*
- Please rate (on scale: of no importance, almost never, not often, often, almost always) the use of the following schemes and mechanisms to hide retail trade receipts: *sales without cash register;*

manipulation of cash register; manipulation of retail prices; overestimating expenses; cash settlements for goods purchases; trade without licence; fictitious agreements in settlements with suppliers; intermediate trade structures.

- Please estimate (in range < 10%, 11-20%, 21-30%, 31-50%, > 50%) the share of settlements in retail trade of the following types: *cash settlements; clearing settlements; barter; travellers cheques, letters of credit, credit cards, other financial instruments; other.*
- Please estimate (in range < 10%, 11-20%, 21-30%, 31-50%, > 50%) the share hidden from taxation by retail trade enterprises.
- Please estimate (in range at least 5%, at least 10%, at least 15%, over 20%) the minimum profitability required by retail trade enterprises to stay in regular production.
- Please rate (on scale: never, low, average, high, very high) the following purposes to which hidden share of receipts is put: *increase owners profits; increase payments to high level staff; increase payments to low level staff; to survive and function normally; to carry informal costs of doing business; other.*
- Please rate (on scale: never, low, average, high, very high) the following cases for which additional payments take place: *rent; supervising organisations; police; suppliers; local authorities; racket; criminal protection; court appeals.*

8.27. In the household survey of the “hidden economy” (meaning in this context the underground economy) the Hungarian Central Statistical Office (1998) included some qualitative questions aimed at collecting citizens’ views. On a five point scale from *totally agree with* to *totally disagree with*, and with the option of replying *don’t know*, respondents were asked to give their opinion on the following statements:

- *The hidden economy is part of life.*
- *The relative size of the hidden economy is not higher in Hungary than in other countries.*
- *Too high taxes and contributions play the biggest role in the creation of the hidden economy.*
- *The high level of the hidden economy spoils our chances of joining the EU.*
- *The hidden economy benefits everybody.*
- *Products and goods needed for everyday life purchased in the hidden economy reduce household expenses.*
- *The hidden economy increases the differences in incomes.*
- *The fight against the hidden economy affects only the “small” people.*
- *The greatest incomes from the hidden economy land up in the underworld.*
- *Like it or not, in certain cases you have to give a tip or gratuity.*

8.3.6. Tax Audit Data

8.28. It is generally believed that surveys on tax evasion never yield reliable results. Because of the risk of prosecution, respondents are unlikely to provide information on tax evasion even if the survey agency asserts that information supplied will never be revealed to third parties. Tax audits, on the other hand, may provide more information than surveys because the enterprises or individuals being audited cannot refuse to respond and are obliged to provide their complete accounts. As previously noted, the main limitation to their use for statistical purposes is that they are rarely conducted on a random basis and thus generalising the results to the total population is difficult if not impossible.

8.29. Typically tax audits are carried out on enterprises in a restricted range of industry classes. The industries are chosen subjectively from amongst those for which tax evasion is believed to be largest. Within each industry samples are likely to be selected subjectively, targeting those enterprises with characteristics that are believed to correlate with higher levels of non-compliance. Even if the stated intention is to select a random sample it is prudent to check that the sample is representative across characteristics believed to relate to non-compliance.

8.30. As described in Section 5.2.5, the *Institut national de la statistique et des études économiques*, (INSEE) in France computed estimates of adjustment coefficients for output and value added based on tax audit data. The Lithuanian Department of Statistics (1998) provides an example of the use of tax returns to

estimate the size of the underground economy. The US Internal Revenue Service (1979) provides another example from the United States.

8.4. Measurements of Underground Production and Related Issues

8.4.1. Introduction

8.31. The previous section describes the sorts of tools available for measuring various aspects of the underground economy. This section outlines the relevance and use of these tools in a number of specific circumstances commonly associated with the underground economy. It includes measurement of underground production in total and estimating the part that remains non-measured. There is also a brief discussion of tax evasion/undeclared income, shuttle trade, cross border shopping, and barter, explaining where they fit in.

8.4.2. Underground Production

8.32. Methods for assessment and measurement of underground production were discussed in Chapters 3-4 from the viewpoint of ensuring that this production is included in GDP estimates. The focus in this section is on producing a separate estimate of total underground production. However, given that activities deliberately concealed from public authorities are equally likely to be concealed from production surveys, there is probably no difference between underground production (in total) and non-observed underground production as measured by the production approach. Thus, the systematic assessment of the scope and likely incidence of non-observed underground activities using an appropriate production based analytical framework such as described in Chapter 3 is useful. The framework helps in identifying the various kinds of activities involved and the different ways in which they might be measured.

8.33. Following the Eurostat and Istat analytical frameworks, underground production can be considered as falling into two possible categories:

- activities that are underground because the enterprises conducting them are not registered;
- activities that are underground because the enterprises conducting them (although registered) under-report.

Activities that are underground because the enterprises conducting them are not registered

8.34. Enterprises that are not registered and are engaged in legal productive activities are likely to be very small. Enterprises with no business address and no advertising other than by word of mouth must be operating on a small scale. However, there may be quite a large number of such enterprises. For example, persons with a regular paid job as a plumber, accountant or teacher, say, who work after hours for their own profit ("moonlighters" as they are sometimes called) count as small-scale enterprises. Because of the numbers, the total production of such enterprises may be quite substantial.

8.35. Failure to register means that the enterprise will not be covered in any survey for which the frame is drawn from the business register. A household or mixed household-enterprise survey approach is a practical way of measuring such underground production. The first option is to obtain an estimate of the total labour input through the regular household labour force survey as described in Chapter 5, to deduct the labour input reported by enterprises in response to an enterprise-based employment survey, and thus to arrive at an estimate of the labour associated with unregistered enterprises. This presumes that the enterprise-based survey gives full coverage of all registered enterprises, and that the labour force survey gives full coverage of labour total input. The alternative is to conduct a mixed household-enterprise survey, in which the first step is to locate a sample of unregistered enterprises and the second step is to sample them. The procedures for conducting such a survey are described in detail in Section 10.3.

Activities that are underground because the enterprises conducting them under-report

8.36. It seems fairly likely that enterprises answer survey questionnaires using the same set of accounts as they prepare for tax purposes. Thus, underreporting of production and/or receipts to the taxation authorities in order to avoid taxes is likely to be reflected in the survey data submitted to the statistical office. In some countries enterprises that sell their output to other enterprises find it difficult to underreport their sales because the purchasing enterprises usually demand receipts to support their own accounts. In such a situation, corrections are only needed for underreporting of sales to households, government and non-profit institutions serving households. In other countries, however, enterprises may collude in under-reporting their sales and purchases, and adjustments for sales to enterprises are thus also required.

8.37. Some overall idea of the magnitude of underreporting in specific industries may be obtained through commodity balances. For example as described by Masakova (2000), crop production may be estimated from seed consumption or milk yield from estimates of forage consumed. In other industries estimates may have to be based on the results of *ad hoc* surveys that collect the incidence of “cash payments” made by households.

8.38. Adding together estimates of all types of underground production for all components of GDP will produce an overall estimate of the total underground production, some, or hopefully even most, of which will be included in the official national accounts' estimates.

8.4.3. Non-Measured Underground Production

8.39. The measurement that is most frequently presented in the media and of interest to many economic analysts is the *non-measured underground production, i.e.*, that part that does not get included in the official national accounts estimates. Non-measured underground production may be obtained by deducting from the estimate of total underground production described in the immediately preceding paragraphs the estimates or adjustments made for underground production during basic data collection and compilation of the accounts. This requires a systematic analysis of the collection and compilation processes to establish where estimates or adjustments for underground activities are made and what their magnitudes are. Such procedures were described in Section 4.3 in the context of computing upper bounds for non-observed and non-measured activities.

8.4.4. Tax Evasion

8.40. Estimates of tax evasion, *i.e.*, unreported income, can be obtained through tax audits. However, as noted in the previous section, most tax audits are not based on random sampling since the auditors usually target those enterprises that they believe are more likely to be under-reporting their income. Thus the results cannot readily be weighted up to give estimates for the whole population. Furthermore the audit process does not necessarily reveal the full extent of the unreported income, uncovering only the part that can be detected in the accounts presented to the taxation authorities. In addition, tax audits cannot be directed at enterprises that are not registered.

8.41. Given that underground production and untaxed production are essentially the same, as noted in Section 8.1, estimates of underground production can be expected to yield fairly good estimates of unreported income from productive activities. However the latter is just one component of tax evasion. A whole range of taxes can be evaded, and not just those levied on incomes.

8.4.5. Shuttle Trade

8.42. As noted in Section 5.5.7, shuttle trade refers to the activity in which entrepreneurs buy goods abroad and import them for resale in street markets or small shops. Often the goods are imported without full declaration in order to avoid import duties. This is usually regarded as part of the underground economy whether or not it is classified as illegal. Shuttle trade is significant in many transition countries in Europe and Central Asia, and generally in countries at the borders of monetary zones.

8.43. The primary measurement method is direct survey of shuttle traders to determine the numbers of shuttle trade journeys and the average values imported. In addition, estimates of smuggling in general and shuttle trade in particular may be obtained from comparisons of supply and demand estimates for the goods involved together with customs data on imports declared and estimates of those not declared, as described in Section 5.5.7.

8.4.6. Cross Border Shopping

8.44. Cross border shopping is the name given to the activity wherein private individuals buy goods abroad because of lower taxes and import them for their own consumption, without declaring them in order to avoid paying import duties. As already noted in Chapter 5, although cross border shopping involves concealment of activities from public authorities with the intention of avoiding taxes, they are not productive activities and thus do not constitute a part of the underground economy.

8.45. However, cross border trade may affect international trade statistics. It may be missed from exports, or imports, or both. If it is missed from exports, the GDP of the exporting country will be underestimated when compiled by the expenditure approach. If it is missed from imports, the GDP of the importing country will be over-estimated when compiled by the expenditure approach if and only if the trade is included in the estimates of consumption.

8.4.7. Barter Trade

8.46. Barter transactions are ones in which a good, a service or an asset other than cash is provided in return for a good, service or asset. According to the 1993 SNA barter transactions are to be treated like monetary transactions and the corresponding values estimated. Thus, in principle, production and subsequent exchange of home produced goods and services within the production boundary are production whether or not they are paid for in currency units or are bartered. In practice, barter on a small scale is ignored both by the taxation authorities and statistical office. However, systematically organised barter of goods and of services through large computerised *time banks* or organised *local currency systems* should not be ignored.

8.4.8. Capital Flight

8.47. According to Abalkin and Walley (1999) *capital flight* may be defined as the transfer of assets denominated in a national currency into assets denominated in a foreign currency, either at home or abroad, in ways that are not part of normal transactions. In other words, transferring assets abroad into foreign banks or foreign securities that goes beyond normal portfolio diversification constitutes capital flight. Assets can be transferred in a variety of ways, in particular:

- transfer abroad of financial assets denominated in a foreign currency;
- accumulation of foreign currency abroad by the failure to repatriate profits; and
- exchanging national currency for foreign currency as a hedge against inflation.

8.48. Laungani and Mauro (2000) note that, in the case of the Russian Federation, assets are leaving the country through under-invoicing of export earnings, fake advance import payments and bank transfers bypassing capital controls. They note that capital flight is occurring because of an unsettled economic environment, macroeconomic instability, relatively high and unevenly enforced tax rates, an insolvent banking system and weak protection of property rights. The costs to society of capital flight may be high and include reduction of domestic savings, shrinkage of the tax base and currency depreciation.

8.49. Capital flight is sometimes approximated using the *hot money* measure, computed as the net errors and omissions in the balance of payments plus net private portfolio investment abroad. Another *broad measure* of capital flight is the net accumulation of foreign assets by the resident private sector.

8.50. Capital flight may or may not be associated with productive activities that are underground or illegal, but it is not a productive activity in itself and it is a mistake to think it should be included in estimates of underground production.