The economic and social impacts of counterfeiting and piracy in Turkey

A REPORT PREPARED FOR BASCAP

September 2011

An ICC initiative

BASCAP

Business Action to Stop
Counterfeiting and Piracy

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Foreword

This study is the first attempt to estimate the magnitude and costs of counterfeiting in Turkey. The magnitude of counterfeiting in the economy includes the value of imported, domestically produced, and digitally retrieved counterfeit products, and adds up to 1% of the GDP. The costs of counterfeiting include tax losses, additional welfare payments, health costs, as well as costs to the wider economy such as lost FDI and exports. Estimates on employment losses due to all these factors also are included. These estimates are based on a Frontier-developed methodology that is built on work by the OECD, and show that counterfeiting is a serious problem for Turkey.

Counterfeiting is not only a law enforcement issue, but is also a core problem that is relevant for economic policy-makers. The recently published Global Competitiveness Report 2011-12 by the World Economic Forum classifies Turkey as a transition economy passing from from an efficiency-driven to innovation-driven stage. Completing this transition will necessitate a tough stance against counterfeiting.

Firms in an efficiency-driven economy compete and grow by cutting down costs, while firms in an innovation-driven economy compete and grow by creating unique value at the global level. Illicit entities that produce counterfeit products may "compete" on cost, but they cannot act as building blocks of an innovation-driven economy. They are destined to stay as small enterprises that generate little or self-employment with low wages, all the while skirting the law. Entities involved in counterfeiting are necessarily driven into informal, illicit markets. They are excluded not only from the tax collection system, but also from the global manufacturing value-chains of modern corporations that bring local firms opportunities to scale up to the global level. Needless to say, informal firms have limited access to bank credit and venture capital, further limiting their growth prospects.

If the Turkish economy is to upgrade to an innovation-driven stage, it will be based on high-impact enterprises that are able to scale-up to the global level by creating unique value. Only firms that are not involved in counterfeiting can acquire and retain global customers and investors in the long-run. It is natural to see this value be distributed to wider society in form of larger employment with higher wages. This is why avoiding counterfeiting should be an economic-policy priority.

Tackling counterfeiting is a difficult challenge. It requires not only close enforcement, but the necessary incentives to create long-lasting transformation in the habits of entrepreneurs. To create a policy environment against counterfeiting requires a high level of policy coordination among different

departments in the government. Dialogue and coordination among the ministries of Culture and Tourism, Justice, Health, the Interior, Economy, Customs and Trade, as well as institutions such as the Turkish Patent Institute and the Scientific and Technical Research Council of Turkey (TUBITAK), as well as between public institutions and private sector representatives are essential.

To ensure coordination and dialogue among so many different agents, political will is critical. This report is a first step in building this political will by revealing the large magnitude and long list of costs associated with counterfeiting and piracy in Turkey.

Guven Sak
Managing director, TEPAV

Foreword

Executive Summary

Counterfeiting and piracy has increased substantially over the last two decades. Counterfeit and pirated products can be found in almost every country in the world, and are an ever increasing challenge to policymakers and legitimate businesses.

In Turkey, counterfeiting and piracy has been recognised as a particularly serious problem. For example, analysis of seizures of counterfeit products at EU borders found that Turkey was one of the top five countries of origin for infringing products, and was the lead country of origin for some product categories, notably foodstuffs. And, as with many other countries, Turkey has seen a rapid increase in digital piracy over the past decade.

A key challenge in ensuring that the appropriate resources and priority is given to combating counterfeiting and piracy is developing good information on the magnitude of counterfeiting and piracy and the scale of its economic and social impacts. Frontier has worked extensively with BASCAP to develop estimates of both the value and impact of counterfeiting and piracy globally and on an individual economy basis. Our analysis has built on the work of the OECD, which identified a number of different categories of impact of counterfeiting and piracy.

BASCAP commissioned Frontier Economics to analyse both the magnitude of counterfeiting and piracy in Turkey alongside the impact that such counterfeiting and piracy has on government and consumers.

The complete picture

The Table below compiles the findings of the report in what we refer to as the complete picture, drawing together our findings in relation to both estimates of the magnitude of counterfeiting and piracy and also to the wider economic and social impacts of such activities.

Table 1. Summary of the wider impacts of counterfeiting and piracy

Category of impact	Estimated impact (US$)
Magnitude of counterfeiting and piracy in Turkey[1]	
Imports of counterfeit products	$3.5 – $4.4 billion
Domestically produced and consumed counterfeit products	$2.6 – $5.2 billion
Digital piracy	$0.4 – $1 billion
Total	$6.5 – $10.6 Billion
Direct costs to government and consumers[2]	
Tax losses and welfare payments	$2.4 billion
Health costs	$340 million
Employment	135,000
Impact of improving IPR[3]	
FDI inflows	$1.9 billion
Export growth	$1 billion
Employment	15,000
National income	$440 million

1 Based on Frontier Economics analysis
2 Based on Frontier Economics analysis
3 Based on findings from Yased research report, impacts reported relate to a 1% increase in the Patent Rights Index

Magnitude of counterfeiting and piracy in Turkey

In terms of magnitude, our analysis finds that the total economic value of counterfeiting and piracy in Turkey is as much as $10.6 billion every year, more than 1% of Turkish GDP. Every year between $3.5 billion and $4.4 billion of counterfeit products are imported into Turkey and consumed by Turkish consumers. Domestic production and consumption accounts for between $2.6 billion and $5.2 billion, while digital piracy accounts for between $400 million and over $1 billion.

Executive Summary

Impact on government receipts and employment in Turkey

The production and consumption of counterfeit and pirated goods does not just harm businesses. It has direct social costs; by diverting consumer spending from the legitimate regulated economy, counterfeiting and piracy reduces government tax revenues and increases welfare spending, destroys legitimate jobs and exposes consumers to dangerous and unregulated products. We also examined these impacts in this study.

With respect to lost tax revenues and higher spending, we examined the impact of counterfeiting in detail on a number of sectors of the economy and extrapolated the findings for the sectors to provide an indicative estimate of the economy-wide impacts of counterfeiting and piracy. At an economy level, the results of the analysis show that counterfeiting and piracy:

- Results in direct losses to the government of $2.4 billion; and

- Results in the destruction of 135,000 jobs, with over 60,000 people estimated to be unable to find re-employment.

Wider economic impacts

The analysis also considered the potential costs arising from consumers being exposed to such dangerous unregulated products. Unfortunately, every year a number of consumers die as a result of their consumption of counterfeit products. Particular causes for concern relate to fake drugs and counterfeit alcohol and food and beverage products. Using data on the value of life and the value of disability free life, we find that the potential costs to consumers in Turkey in terms of death and injury could be as much as $340 million per year, not including the costs of the health services required to care for those requiring treatment following exposure to unsafe counterfeit products.

Finally, drawing on work commissioned by Yassed, we find that even small improvements in IPR protection could lead to substantial increases in FDI with positive knock on effects on exports, employment and national income.

Executive Summary

2 Introduction

Counterfeiting and piracy has increased substantially over the last two decades. Counterfeit and pirated products can be found in almost every country in the world, and are an ever increasing challenge to policymakers and legitimate businesses.

In Turkey, counterfeiting and piracy has been recognised as a particularly serious problem.. For example, analysis of seizures of counterfeit products at EU borders found that Turkey was one of the top five countries of origin for infringing products, and was the lead country of origin for some product categories, notably foodstuffs. Turkey has also been identified as one of the leading originators of counterfeit pharmaceutical products, with a US study of online drugs purchases finding turkey to be the largest supplier of counterfeit products. Finally, as with many other countries, Turkey has seen a rapid increase in digital piracy over the past decade.

The Turkish government has clearly signalled its intent to tackle the challenge of counterfeiting and piracy. It has strengthened considerably its IPR protections. However, it would appear that significantly more work and resources need to be brought to bear on the challenge.

A key challenge in ensuring that the appropriate resources and priority is given to combating counterfeiting and piracy is developing good information on the magnitude of counterfeiting and piracy and the scale of its economic and social impacts. In this report, we seek to develop estimates both of the magnitude of counterfeiting and piracy in Turkey, and the economic and social impact that such activities have in terms of losses to government and consumers.

To do so, we build on the empirical work begun by the OECD, in their 2005 report. In that report, the OECD provided an overarching methodology for identifying the magnitude and impact of counterfeiting and piracy. They identified four categories of impact:

- **Category 1: Counterfeit and pirated goods moving through international trade.**

- **Category 2: Value of domestically produced and consumed counterfeit and pirated products.**

- **Category 3: Volume of pirated digital products being distributed via the Internet.**

- **Category 4: Broader economy-wide effects.**

However, in their report the OECD provided estimates for only the first of these four categories. Since publication of that report Frontier has worked extensively with BASCAP to develop estimates of the other categories. Building on the work of the OECD, Frontier has now developed models, using publicly available data, to estimate the value and impact of counterfeiting and piracy across the four categories identified by the OECD.

In this report we apply the models we have developed to Turkey, to identify both:

- The likely magnitude of counterfeiting and piracy in turkey; and

- The impact it is having on the economy and society.

The models are based on detailed microeconomic data for the Turkish economy.

The remainder of this report is structured as follows:

- Section 2 sets out the potential magnitude of counterfeiting and piracy in Turkey;

- Section 3 sets out the economic and social impacts of counterfeiting and piracy in turkey; and

- Section 4 provides some conclusions.

Introduction

3 The potential magnitude of counterfeiting and piracy in Turkey

In this chapter we provide an estimate of the level of counterfeiting and piracy in the Turkish economy. As noted in the introduction, measuring counterfeiting and piracy is challenging because such activities operate outside the legal framework they do not lend themselves easily to traditional economic and statistical analysis.

Building on the work of the OECD, we have developed a model to estimate the total magnitude of counterfeiting and piracy at the country level. The model is based on publicly available Turkish data on imports and exports, economic activity by sector, counterfeit seizures and estimates of the prevalence of counterfeiting from a range of survey sources and industry bodies. Following the OECD, the model breaks counterfeiting and piracy into three distinct elements:

- **Imports of counterfeit products:** this seeks to capture the proportion of globally produced counterfeit and pirated products that are consumed in Turkey;

- **Domestically produced and consumed counterfeit and pirated products:** this captures those counterfeit and pirated products that are produced within Turkey and consumed within Turkey

- **Pirated digital products being distributed via the Internet:** this captures illegal use of prated digital products within Turkey – it focuses on the music, movies and software industries.

3.1 Imports of counterfeit and pirated products

As noted above, this element of the model seeks to capture the share of globally produced counterfeit and pirated products that are consumed in Turkey.

To arrive at our estimate for Turkey we need to identify two factors:

- The total value of counterfeit and pirated products moving through international trade; and

- The proportion of those products that are consumed in Turkey.

With regard to the first element, the estimate of the value of traded counterfeit and pirated products derives from the global estimate of trade in counterfeit and pirated products calculated in the Frontier Economics report, *"Estimating the global economic and social impacts of counterfeiting and piracy"* (February 2011).

This estimate was based on the OECD's original report, based on 2005 data (including seizure estimates from the Turkish authorities) which estimated that the value of counterfeiting and piracy in international trade was $200 billion. This figure was then updated to reflect:

- More recent data on trade flows; and

- More up to date figures on seizures of counterfeit products.

These updates suggest that, globally, the value of internationally traded counterfeit and pirated products in 2009 was between $287 billion and $362 billion.

To estimate the Turkish share of internationally traded counterfeit and pirated products we need to understand how many such products are imported into the country. It is difficult to get accurate information on the level of imports.

To reach a preliminary estimate we have therefore taken the Turkish share of total world imports as a proxy for its share of total counterfeit imports. We have taken world import shares from 2010 and applied them to the estimate for total value of internationally traded counterfeit and pirated products of $287 billion to $363 billion. In 2010, Turkey imported approximately $185.5 billion worth of goods, which equates to roughly 1.2% of total world value of imports.

Assuming that the Turkish propensity to import counterfeit products is broadly equivalent to its overall propensity to import, this provides a reasonable proxy for the Turkish consumption-based share.

On this basis, we estimate that Turkey consumes **$3.5-$4.4 billion** of internationally traded counterfeit and pirated products.

3.2   Domestic production and consumption of counterfeit and pirated products

The second element of the model relates to the proportion of counterfeit and pirated products that are both produced and consumed in Turkey. The expectation, based on a range of industry sources, consumer surveys and seizure data is that this number is likely to be relatively high. Large numbers of consumers (58%) report consuming counterfeit products, which is significantly above reported averages for Western Europe (28%). Turkey is also considered to be a significant producer of infringing foodstuffs and pharmaceuticals.

To develop an estimate of domestic production and consumption of counterfeit products, we have drawn heavily on the methodology developed in our earlier 2011 report *"Estimating the global economic and social impacts of counterfeiting and piracy"*. This report sets out in detail the approach we have taken to measuring the value of domestically produced and consumed counterfeit and pirated products. The

The potential magnitude of counterfeiting and piracy in Turkey

report found that globally, the value of domestically produced and consumed counterfeit and pirated products was between $140 and $215 billion.

Using the same methodology, we have developed an estimate of the level of domestic production and consumption in Turkey. The approach builds upon the methodology used by the OECD to reach their estimate of the value of such activities in world trade, and relies on two elements:

- An estimate of the proportion of products that are likely to be counterfeit or pirated; and

- An estimate of the magnitude of economic activity that is potentially susceptible to counterfeiting and piracy (for example, many primary industries and service industries are not susceptible to counterfeiting and piracy)

The Annexe provides a technical description of the approach taken to arrive at these estimates. In essence, we derive the first element from the detailed econometric work carried out by the OECD, which was based on detailed survey evidence from 70 countries, including Turkey.

The data on susceptible sectors comes from Turkish national accounts data, for 2009 (see figure below).

The potential magnitude of counterfeiting and piracy in Turkey

Table 2. Breakdown of economic activity

ISIC category	Description of economic activity
ISIC A & B	Agriculture, hunting, forestry, fishing
ISIC C, D & E	Mining, manufacturing, utilities
ISIC D (also reported separately)	Manufacturing
ISIC F	Construction
ISIC G & H	Wholesale, retail trade, restaurants and hotels
ISIC I	Transport, storage and communication
ISIC J, K, L, M, N, O & P	Other activities

On the basis of the above methodology, we estimate that Turkey consumes between $2.6 billion and $5.2 billion of domestically produced counterfeit products.

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3.3   Digital piracy in Turkey

Digital piracy in Turkey is becoming increasingly significant. 43% of households have internet access, and 40% of those households now have a broadband connection. The Figure below shows the growth in internet access over the last five years, with penetration rates increasing threefold from 13% in 2006.

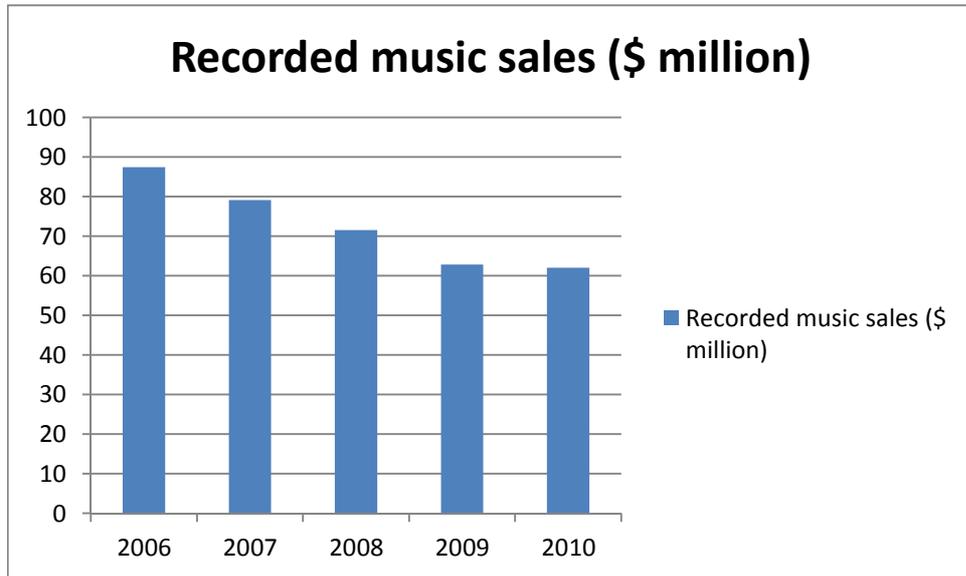**Figure 1.** Growth in household internet penetration
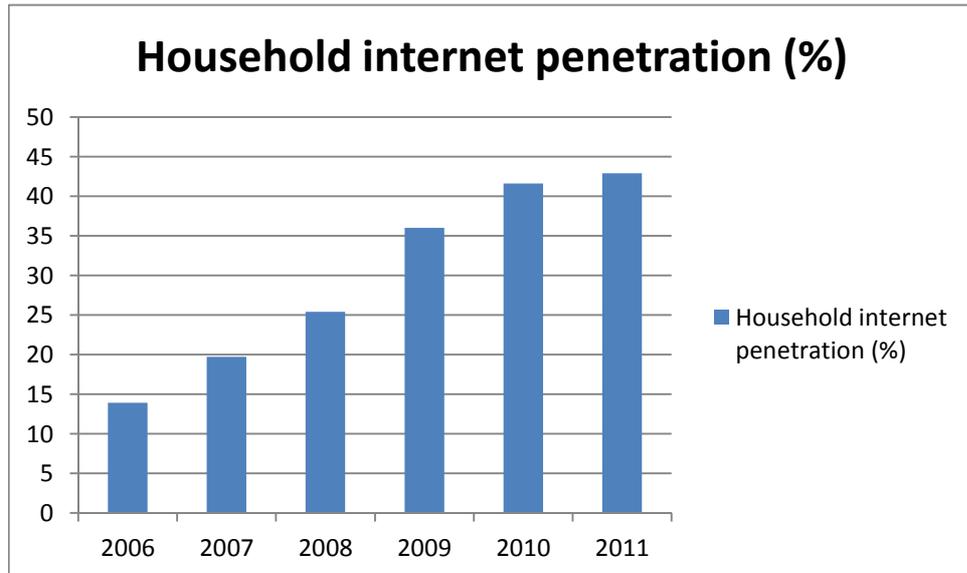
Source: Turkstat

This growth in internet access has been accompanied by a significant increase in digital piracy:

□   A recent study by IDC for the BSA suggests that piracy rates for software were approximately 63%, compared to a global piracy rate of 43%. The report estimated that the commercial value of pirated software was in excess of $400 million.

□   Recorded music sales in Turkey have declined dramatically over the last five years.   In line with global trends, sales have dropped by approximately 30% from over $87 million in 2006 to $62 million in 2010 (see figure below). Much of the fall in sales is estimated to be as a result of the growth of digital piracy.

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Figure 2. Recorded music sales in Turkey

Recorded music sales ($ million)

[Bar chart showing recorded music sales in $ million for 2006–2010. Y-axis ranges from 0 to 100 in increments of 10. Bars: 2006 ≈ 87, 2007 ≈ 79, 2008 ≈ 71, 2009 ≈ 63, 2010 ≈ 62. Legend: ▪ Recorded music sales ($ million)]

Source: IFPI - Recording Industry in Numbers 2011

Frontier's 2011 report brought together international evidence from business and academic sources to develop an indicative estimate of the potential scale of digital piracy. That work concluded that, globally, the value digitally of pirated products was between $30 billion and $75 billion, representing between 6% and 10% to the total value of counterfeit and pirated products.

The data is not available on a national basis to replicate this analysis for Turkey. Our estimate of digital piracy is therefore based on an application of global rates to Turkey. This assumption seems reasonable, given that where sectoral information is available it suggests that Turkey is in line or ahead of global trends (e.g. rates of software counterfeiting in Turkey are in excess of those reported globally, while the decline in music revenues matches global trends. On this basis, the magnitude of digital piracy in Turkey is estimated to be between $400 million and $1 billion.

3.4   Summary

This chapter has set out an estimate of the magnitude of counterfeit and pirated products that are consumed in the Turkish economy. The estimates are based on previous methodologies developed by Frontier for Bascap, and build on the work of the OECD. The estimates are also based on up to date and publicly available data on the Turkish economy.

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Our key finding, as set out in the Table below, is that the value of counterfeit and pirated products is between $6.5 billion and $10.6 billion. To put this figure in context, it represents between 0.5 and 1% of Turkish GDP.

Table 3. Total value of counterfeit and pirated products consumed in Turkey

	Estimate $billion
Imports of counterfeit products to Turkey	$3.5 - $4.4
Domestically produced and consumed counterfeit and pirated products	$2.6 - $5.2
Digital piracy	$0.4-$1
Total	**$6.5 - $10.6**

Source: Frontier Economics

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4 The wider economic impacts of counterfeit and pirated products

The previous chapter identified that a significant volume of counterfeit and pirated products are both produced and consumed in the Turkish economy every year. In this chapter, we seek to identify the impact that such consumption has on government and consumers.

For government, counterfeit and pirated products lead to higher spending and lower revenues. Government loses valuable sales taxes, corporation taxes and payroll taxes, as a result of consumers switching consumption from legitimate purchases to the black economy. Governments face higher costs as a result of the need for enforcement actions against IPR infringements and higher welfare payments to those who lose their jobs as a result of counterfeiting and piracy.

For consumers, apart from the costs of higher taxes, and potentially wasted money spent on faulty or poor quality counterfeit products, the consequences of consuming counterfeit and pirated products can be death or serious injury. Counterfeit products are obviously not regulated, and can often be faulty or dangerous (particularly for example counterfeit foodstuffs and pharmaceuticals).

Developing good quantitative estimates of the above types of effect can be highly challenging. In earlier work for Bascap, again building on the work of the OECD, Frontier developed a model that can be applied at the country level to develop indicative estimates of these wider impacts of counterfeiting and piracy.

The model has three key elements to it:

- An estimate of the net impact of counterfeiting and piracy on government revenues and employment (the technical annexe to this document provides the details of the modelling approach);

- An estimate of the impact of improving IPR protections on Foreign Direct Investment; and

- An estimate of the health costs associated with the consumption of unregulated counterfeit products.

The remainder of this chapter sets out the findings from our analysis under these three headings.

4.1 The impact of counterfeiting and piracy on government revenues and employment

When thinking about the economic harm that counterfeiting and piracy can cause governments and society, there are two key types of effect to consider:

- **Tax and welfare impacts** – many counterfeit products are sold outside the legitimate economy, and so are not subject to sales taxes. Additionally, firms producing legitimate products make lower profits, and so pay lower taxes to government (e.g. lower sales and corporation taxes). Reduced employment and salaries will lead to lower income taxes being paid by workers. Finally, government will face higher welfare payments as a result of the unemployment generated by counterfeit products

- **Employment** – if firms producing legitimate products lose sales and profits to counterfeits, this is likely to result in a reduction in employment.

To estimate the economic impacts of counterfeiting and piracy on these categories we have focused on estimating the impacts on four representative sectors of the economy – food and beverages, pharmaceuticals, luxury goods and software. We have then extrapolated the findings from these four sectors to the wider Turkish economy.

In order to develop estimates of economic impacts we have analysed levels of counterfeit consumption for each sector, alongside estimated displacement rates for legitimate products. We have based our analysis on a range of data sources, including

- detailed industry level data on firm turnover, profitability and employment;

- data on current Turkish tax rates and benefit payments; and

- data on unemployment durations in Turkey.

In the following sections, therefore, we set out:

- the assumptions used in the model regarding counterfeiting levels and displacement;

- the data used in the model; and

- the key findings from the analysis

4.1.1 Counterfeiting levels and displacement

Due to the nature of counterfeit products, there is very limited data available regarding both absolute consumption levels of counterfeits and also about the degree of displacement. We have reviewed a range of existing national and international research on this topic for the industries concerned. We have been deliberately conservative to illustrate that even low rates of counterfeiting are associated with substantial harm to consumers and governments.

In terms of our approach, we have distinguished between:

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□ **Those who purchase counterfeits knowingly.** We have assumed relatively modest displacement rates for this category of customer, as surveys typically find that those who knowingly purchase counterfeits would have been relatively unlikely to purchase originals. We have also varied the rate depending on the product under consideration, to reflect the necessity of purchase. For example, we have assumed that displacement rates are lower for luxury goods than pharmaceuticals.

□ **Those who purchase counterfeits unknowingly.**   For those purchasing unknowingly we have assumed that a relatively high proportion of the products consumed displace genuine sales. Even for this category, however, we have not assumed 100% displacement rates. This is because counterfeits are typically somewhat cheaper than genuine products and even with unknowing purchases there is a need to take into account price elasticity effects. Survey evidence commissioned by BASCAP suggests that individuals tend to be fairly price sensitive with respect to these products.

Taking food and beverages, we have assumed that 2% of food and beverage products are counterfeit. As for the previous studies on the UK and Mexico, a small proportion of consumers are assumed to knowingly purchase counterfeit food and beverages but there are high displacement rates with a substantial proportion of consumers purchasing the genuine product in the absence of the counterfeit.

With regard to luxury goods, we have assumed that between 2% and 4% of products are counterfeits with only 40% of consumers who knowingly purchase counterfeit products consuming genuine products in the absence of the counterfeit.

For pharmaceuticals, the overall reported rates of counterfeits tend to be low. We have assumed that a very low proportion of consumers knowingly purchase counterfeit pharmaceuticals and we assume that almost all of those that unknowingly purchase counterfeit pharmaceuticals would have purchased the genuine product.

Finally, for software, reported rates of counterfeits vary substantially from rates of a couple of percent up to 60% plus. To be conservative, we have assumed a figure at the lower end of this range. We have assumed a high displacement rate, but one that is less than 100%.

4.1.2   Data sources

Data on industry specific turnover, profits and employment for Turkey for 2008 was collected from TurkStat, the Turkish Statistical Institute. The NACE[1] codes used for the four industries that have been analysed are set out in the Table below.[2]

Table 4. Turkey - NACE codes used to capture the four industries

Industry	NACE description	NACE code
Luxury goods	Manufacture of luggage, handbags and the like, saddlery and harness, Manufacture of footwear, Manufacture of perfumes and toilet preparations, Manufacture of watches and clocks, Manufacture of jewellery and related articles, Manufacture of leather clothes, Manufacture of other wearing apparel and accessories	19.2, 19.3, 24.52, 33.5, 36.2, 18.1, 18.2
Food and beverages	Production, processing and preserving of meat and meat products, Processing and preserving of fish and fish products, Processing and preserving of fruit and vegetables, Manufacture of vegetable and animal oils and fats, Manufacture of dairy products, Manufacture of grain mill products, starches and starch products, Manufacture of prepared animal feeds, Manufacture of other food products, Manufacture of beverages	15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9
Pharmaceuticals	Manufacture of basic pharmaceutical products, Manufacture of pharmaceutical preparations	24.41, 24.42
Software	Software Publishing Activities	72.21

Source: Eurostat, Frontier analysis

Data on economy wide unemployment for Turkey was taken from the OECD[3] and is set out in the Table below.

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[1] 1   NACE Codes are a pan-European classification system which group organisations according to their business activities. It assigns a unique 5 or 6 digit code to each industry sector.

[2]   In some cases, the code was felt to be too general to capture the relevant market so we have attempted to adjust for this where possible.

[3]   The figures relate to unemployment across the economy so are not specific to the four industries considered.

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Table 5. Turkey - length of unemployment

Length of unemployment	
<1 month	2.9%
1 – 3 months	25%
3 – 6 months	27%
6 – 12 months	20%
> 1 year but re-entry to labour force*	17%
Long-term unemployment with no re-entry to the labour force*	8%*

Source: OECD Stats, Frontier analysis

*No information on long-term unemployment without re-entry to the labour force was available. These figures of 17% and 8% have been assumed.

Data for tax and benefit rates comes from a combination of Turkstat and the OECD. The data is set out in the Table below.

Table 6. Turkey - tax and benefit rates applied

	Rate assumed
Sales tax	18%
Corporation tax	17%
Individual taxes	23%
Benefit payments	$117 per week*

Source: Frontier analysis

* Weekly job seeker allowance payments for a single person, 2006 rates.

4.1.3   Key findings from the analysis

The Table below sets out the key impacts on taxes and welfare payments associated with the four sectors examined in the analysis (food, software, pharmaceuticals and luxury goods. The Table shows that the total loss to the

The wider economic impacts of counterfeit and pirated products

government across the four sectors is approximately $390 billion. The largest element of the loss is the loss in business taxes.

Table 7. Impact on Turkey - tax receipts and benefit payments

Tax receipt/benefit payment*	Impact
Business taxes**	$350 million
Income tax	$20 million
Benefit payments	$20 million
Total	**$390 million**

Source: Frontier analysis

**Includes sales tax and corporation tax

In terms of employment, we have distinguished between short-term job losses and long-term unemployment. Essentially, the short term losses refer to the jobs that are destroyed in the four sectors as a result of counterfeiting and piracy, but where the majority of those who lose their jobs are able to find alternative employment. The long term unemployment figure refers to those workers who lose their jobs as a result of the impact of counterfeiting and piracy, and are unable to find alternative employment.

The analysis shows that in total short term losses would be just over 9,000 for the four sectors. The long term employment losses are estimated to be just over 4,000. WE note that the personal and family trauma associated with even temporary unemployment should not be lightly discounted. People may quickly get into arrears on mortgages or personal debts, have difficulty paying medical expenses (as benefits are often linked to employment) or be forced to relocate to find alternative employment.

It is important to note that the effects identified here relate only to the direct effects on the relevant industries. We have not sought to identify or include knock-on multiplier effects on other parts of the economy or supply chain.

Economy-wide findings

We have extrapolated the findings for the four sectors to analysed in detail to provide an indicative estimate of the potential impact of counterfeiting and piracy at an economy-wide level. We have done so using a fairly simple, but conservative approach.

For tax and welfare impacts we have used the four sectors relative proportion of GDP to weight the impacts. However, we have recognised that the four sectors

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chosen for the analysis may be more susceptible to counterfeiting than other sectors, and so weighting proportionately might overstate the effects on government revenues. We have therefore applied a discount factor of 50% to the estimates. Using this approach, we estimate that tax the government loses approximately **$2.4 billion** in tax revenues and higher welfare spending due to counterfeit and pirated products.

For employment impacts we have followed a similar methodology to extrapolate the economy wide estimates. However, instead of using proportion of GDP to weight the impacts we have instead used the proportion of employment accounted for by the four sectors. Again, we have applied a 50% discount factor to account for any upward bias in our estimates.

On the basis of this methodology, we found gross economy wide lost employment of **135,000** in Turkey due to counterfeit and pirated products. The net loss (once re-employment has been factored in) is just over 60,000 jobs.

Table 8. Economy wide effects on Turkey due to counterfeit and pirated products

Lost taxes and higher welfare payments	$2.4billion
Lost employment	135,000

Source: Frontier analysis

It is important to note that the methodology used to calculate the figures we have presented above is evidence based as far as possible. We have made use of publically available data from reputable sources such as the OECD and the Turkish national statistics office. However, it has been necessary to make a number of important assumptions to reach these estimates.

The most significant assumptions relate to the proportion of goods in the market place that are counterfeit and how the availability of such goods affects demand for the genuine product. We have based our assumptions about counterfeiting rates on the evidence that is available. However, for some industries this information is sparse and varies from report to report. The information that is available can be difficult to translate into volume and value measures that allow the effect on industry turnover to be accurately assessed.

The results we have reported are sensitive to the counterfeiting rate that has been assumed. Halving the proportion of counterfeit products, halves the impact on government receipts and expenditures. Doubling the rate doubles the impact. Due to the sensitivity of findings to these rates, this is an area where future work should be strongly focused.

The other assumptions related to the relationship between the demand for counterfeit products and genuine products are also important. Halving the proportion of consumers who knowingly purchase counterfeits, increases lost government tax receipts by over 10%. Halving the proportion of consumers that knowingly purchased counterfeits, but would otherwise have purchased the genuine article, reduces lost government tax receipts by around 11%. This is also an area where further work would be fruitful.

4.2   The impact of improving IPR protection on FDI

Until recently, a fairly substantial strand of the development literature argued that it made economic sense for some countries to allow IPR infringement, as this allowed firms to access technologies and increase production.

However, more recently the FDI literature has examined the determinants of firm level FDI decisions and the net effects of improved IPR enforcement. This strand of literature suggests that, where countries implement IPR reforms:

- FDI increases;
- the rate of technology transfer increases;
- the overall increase in legitimate economic activity more than compensates for the loss of imitation activities; and
- the resources allocated to R&D in the developed markets increases.

This analysis suggests therefore that countries that are currently producers of counterfeit products would actually be better off with stronger IPR enforcement, as the consequent increase in FDI more than offsets the loss of activity associated with reduced counterfeiting. Moreover, as the new activity is in the legitimate economy, there is also a replacement effect as illegal activities get crowded out, which should also impact positively on working conditions and tax revenues.

Following this strand of literature, research commissioned by Yased examined the potential benefits of increasing intellectual property rights protection on FDI in Turkey. The work was based on papers by Park and Lippoldt, who examined the relationship between improving IPR protection (using the Patent Rights Index) and inflows of FDI. That work identified that a 10% increase in the Patent Rights Index would lead to a 16% increase in the inflow of FDI to a country.

The paper by Yased sets out the economic benefits associated with such an improvement for Turkey. It suggests that for every percentage point increase in the Patent rights index:

- FDI would increase by $1.9 billion;

- 15,000 jobs would be created;

- Export volumes would increase by over $1 billion; and

- National income would increase by $440 million.

4.3   Health impacts

This element of our analysis considers the impact and potential costs arising from consumers being exposed to dangerous, unregulated products. Unfortunately, every year a number of consumers die or suffer serious injury or ill-health as a result of their consumption of counterfeit products. These concerns are likely to be of particular issue in Turkey given the magnitude of consumers who admit to purchasing counterfeit products. For example, a survey of consumers in Turkey found that 58% of consumers admitted to purchasing counterfeit products, compared to an average of 28% for Western Europe.

It is also likely to be of concern given the proportion of unregulated food and pharmaceutical products that are produced and consumed in Turkey. EU customs data found that Turkey was the leading country of origin for infringing foodstuffs. Turkey is also regularly highlighted as a key source of counterfeit pharmaceuticals. A recent study found that Turkey ranked fourth in terms of arrests for the production of counterfeit medicines.

There is substantial informal evidence of the impact that the consumption of counterfeit products has on consumers. In terms of the most high profile examples:

- in 2011 a number of Russian tourists died after consuming counterfeit whiskey,

- in 2009 it was estimated that 11 people died and a number of others were injured as a result of the consumption of counterfeit alcohol,

- in 2005 23 people died as a result of the consumption of counterfeit alcohol, while many others were made seriously ill and required hospitalization.[4]

Unfortunately, Turkey does not formally collect data on deaths, injury and ill-health associated with the consumption of counterfeit products. In order to develop an estimate of these costs for Turkey, we have therefore had to

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[4]   See for example, Forzelt, M., (2003) *"counterfeit goods and the public's health and safety"*

extrapolate our findings from our previous analysis of the wider impacts of counterfeiting and piracy.

Our previous report estimated that the health costs associated with the consumption of counterfeit and pirated products. The estimate was derived from estimates of:

- the number of deaths and injuries associated with the consumption of counterfeit products: the report drew on meta-analysis from a number of academic papers to estimate an average number of incidents per year; and

- the value of statistical life: Estimates of the value of a life tend to be calculated on one of two bases. They either estimate the present value of future earnings for that individual over their remaining life time. Alternatively, they are based on survey based evidence that assesses individual responses to small increases in risk. Since there is much debate as to the appropriate value of an individual life, we used a number of different estimates to do sensitivity checks on our central estimate5.

Our previous report estimated that the costs of death, injury and ill-health were in the region of $21 billion dollars across the G20. To extrapolate the findings of this analysis to Turkey, we assume that Turkey has the same prevalence of deaths, injury and ill-health per million of population as the G20 average. We suggest that this is not an unreasonable estimate given the prevalence of food and pharmaceutical counterfeiting in Turkey (two of the key categories associated with death, injury and illness).

Using the same estimates of the value of a statistical life, we estimate that the potential costs to consumers in Turkey in terms of death and injury could be as much as $340 million per year, not including the costs of the health services required to care for those requiring treatment following exposure to unsafe counterfeit products.

4.4   Summary

This Chapter has examined the wider economic and social impacts associated with counterfeiting and piracy in Turkey. In particular, it has examined:

- the net impact of counterfeiting and piracy on government revenues and employment;

- the impact of improving IPR protections on Foreign Direct Investment; and

- the health costs associated with the consumption of unregulated counterfeit products.

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5   For example, The EPA uses a Value of Statistical Life (VSL) of $6.9 million

The key findings of the analysis suggest that counterfeiting and piracy has significant negative effects on direct government receipts and expenditure, on employment, both short and long term, and on health outcomes. Moreover, even small improvements in IPR protections would be likely to result in a significant increase in FDI, with consequential benefits for national income and employment.

The Table below sets out the key findings from the analysis

Table 2. Summary of the wider impacts of counterfeiting and piracy

Category of impact	Estimated impact ($)
Direct costs to government and consumers[1]	
Tax losses and welfare payments	$2.4 billion
Health costs	$340 million
Employment	135,000
Impact of improving IPR[2]	
FDI inflows	$1.9 billion
Export growth	$1 billion
Employment	15,000
National income	$440 million

1 Based on Frontier Economics analysis

2 Based on findings from Yased research report, impacts reported relate to a 1% increase in the Patent Rights Index

The wider economic impacts of counterfeit and pirated products

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This annexe provides further details of the analytical and modelling approaches used to derive estimates of:

- domestic production and consumption of counterfeit products; and

- the wider economic impacts of counterfeiting and piracy

Estimation approach for domestic production and consumption of counterfeit products

The estimate of domestic counterfeiting and piracy was built on survey evidence collected from custom authorities in 70 countries (including Turkey) containing details about the number of interceptions and infringements recorded between 1999 and 2005. This information was used to build a picture of the flows of counterfeit and pirated products originating from a wide range of different source countries. Using this information, the OECD developed two indices to capture proportionate flows of counterfeit products in world trade which inform us about the relative frequencies with which different types of counterfeit products from different source countries appear in world trade.

To calculate the value of domestic counterfeiting and piracy, we take the OECD's estimates of the proportion of counterfeit and pirated products in world trade as our starting point. Our methodology follows three steps:

- **Step 1:** Take the simulated counterfeiting propensities for each product category in each source economy estimated and applied by the OECD.

- **Step 2:** Identify the relevant categories of GDP that are likely to be exposed to domestic counterfeit products. Only a limited amount of total economic activity is likely to be exposed to counterfeit activity. [6] The OECD identified a number of sensitive product categories. [7] We map these sensitive product categories to relevant GDP statistics for Turkey (see Table below).

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[6] GDP captures more than the production of goods, so while counterfeiting and piracy impacts virtually every product category, only part of GDP is affected.

[7] These were categories of products believed to be exposed to counterfeiting and piracy activity.

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    ▫   **Step 3:** We apply the counterfeiting propensities from step 1 to the categories of GDP identified in step 2 for Turkey to estimate the value of domestic counterfeit and pirated production and consumption.[8]

We also varied the assumption about the link between the propensity for a source economy to export counterfeit and pirated products and its propensity to produce them for local consumption. Specifically, we used evidence from a study by the Japan Patent Office which outlines the differences in counterfeit production and consumption within and outside of Asia. Our 2011 report contains further details of this element of the analysis.

As noted above in **step 2,** a key element of the analysis is identifying the appropriate elements of GDP to which the propensity indices should be applied. The OECD identified 63 sensitive product categories: so called because they were likely to contain counterfeit and pirated products. The majority of sensitive product categories identified by the OECD fall within ISIC D: manufacturing. We used this ISIC category as a proxy for the sensitive product categories contained within GDP. This captures the majority of sensitive products identified by the OECD but it will also include some sub-categories of manufacturing that are not deemed to be sensitive. For this reason, the value of domestic counterfeiting and piracy calculated using this measure is likely to be an upper estimate

The modelling approach to estimating wider economic impacts

The following section provides a description of the model developed in the Frontier Economics May 2009 report, to estimate the harm caused to and impact on governments and consumers due to counterfeiting. The section is structured as follows:

▫   definition of counterfeiting and the counterfactual; and

▫   approach to estimating measures of harm.

Definition of counterfeiting and identification of the counterfactual

The starting point is to identify what exactly it is we are trying to measure, and what it is we should compare the measure against. What we are trying to

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8   This makes the assumption that there is a strong relationship between the ratio of counterfeit products in a country's exports and the ratio of counterfeit products in its domestic production (we are also implicitly assuming that there are no countries that produce counterfeits for domestic production only). We have also drawn on a range of other sources to understand and vary the assumed relationship between counterfeiting and piracy in international trade and domestic counterfeiting/piracy production and consumption.

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measure is the loss to the economy and society overall associated with counterfeiting and piracy. A counterfeit or pirated good describes any product that passes itself off as a genuine product, or infringes in some way the brand, copyright or IP of a legitimate product.

To be robust, this needs to take account of what would have happened in the absence of counterfeiting, rather than just look at gross measures of volumes of counterfeiting.

To illustrate this point, consider estimates of lost sales arising from counterfeiting. Some studies determine an estimated level of counterfeiting and assume that this translates directly into lost sales for the producers of legitimate products. However, from an economic perspective this is not a valid measure.

First, we need to categorise consumers into those that knowingly purchase counterfeit products, and those who purchase them in the belief that they are genuine. Those who knowingly purchase counterfeit products are, depending on the sector, unlikely to have purchased the genuine equivalents. Typically, they purchase the counterfeit because it has characteristics of the genuine product but is substantially cheaper. Consequently, only a portion of these sales are likely to have replaced sales of the genuine product.

For customers who were deceived into purchasing the product there may also be a price element. A number of analyses suggest that counterfeit products (even those passing themselves off as genuine) are priced at a discount on the genuine products. Consequently, even for customers who are deceived into purchasing the products, not all of those purchases would have occurred in the absence of the counterfeit product.

This means that taking a gross measure of counterfeits and assuming that this equates to the loss made by producers of the genuine product is likely to over-estimate the losses associated with counterfeiting. In estimating the harm to government and consumers, therefore, we must make assumptions not only about the level of counterfeiting, but also the degree of displacement between counterfeit products and genuine products.

Approach to estimating measures of harm

When thinking about the harm that counterfeiting and piracy can cause consumers and governments, we can identify a series of different types of effect (this builds on the recent OECD analysis):

- **Employment** – if firms producing legitimate products lose sales and profits to counterfeits, this is likely to result in a reduction in employment;

- **Tax and welfare payments** – many counterfeit products are sold outside the legitimate economy, and so are not subject to sales taxes.

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Additionally, firms producing legitimate products make lower profits, and so pay lower taxes to government. Reduced employment and salaries will lead to lower income taxes being paid by workers. Finally, government will face higher welfare payments as a result of the unemployment generated by counterfeit products;

In the sections that follow we set out a methodology for estimating these effects. Before doing so, however, it is important to note that this approach is based on making a number of assumptions about levels of counterfeiting and the impact that counterfeiting will have on firm behaviour. In particular, to allow for tractable aggregate analysis we carry out the analysis in a static setting.

We would hope that as further analysis is carried out over time many of these assumptions can be replaced by evidence and analysis.

Employment and the tax base

To identify the impact of counterfeiting on employment and the tax base one must begin by making assumptions regarding the following:

- **The level of counterfeiting –** one must begin by making an assumption regarding the level of counterfeiting, and also the sectors affected by counterfeiting. One could either make an assumption that counterfeiting affects all product sectors equally, or more realistically, that levels of counterfeiting vary by product market. Estimates commonly used suggest a range of 0-10% of products may be counterfeit;

- **The impact on firm output and pricing** – the next key assumption relates to the impact of counterfeiting on firm output and pricing decisions. To make the analysis tractable it is carried out in a static setting and so firms are assumed not to adjust their pricing, distribution channels or other behaviour. In terms of output reduction some studies assume a one-to-one relationship between counterfeiting and reductions in firm output, however, this is an overly strong assumption.

Once these assumptions are in place, the analysis can focus on identifying the impact on the tax base and employment of an assumed reduction in output, while holding all other factors constant.

Below we set out the tax and employment effects that can be measured. The analysis needs to be carried out at a sectoral level as levels of turnover, employment and sales taxes are likely to vary by product market.

Business tax implications

Key business taxes that are likely to be affected directly include sales tax/value added tax, and corporation taxes. Below we set out a methodology for measuring the impact on each.

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- **Sales tax/value added tax:** For each product category we identify the appropriate level of sales tax/value added tax. This rate is applied to the assumed reduction in output (typically measured as a reduction in industry revenues) to provide an estimate of the losses in terms of sales taxes.

- **Corporation taxes.** To get an accurate estimate of corporation tax it is important to identify the relationship between output and profitability. Depending on data availability, this can be done either by using industry level profitability data and assuming a reduction that is proportionate to the output reduction, or by calculating a profit margin and applying this to the proportion of industry revenues that is assumed to be lost. Once the level of lost profit has been identified, the appropriate rate of corporation tax is applied to identify the level of tax loss.

Employment effects

Identifying the wider costs of counterfeiting on employment requires us to:

- estimate the loss of employment associated with a reduction in output or profitability;

- convert the gross loss of employment into a net loss (number of individuals not gaining new employment); and

- apply appropriate income taxes and welfare benefit figures to the net loss figures.

The starting point is to try to identify the employment losses associated with an assumed reduction in output and/or profitability. This is difficult and assumptions are required in order to identify an estimated employment effect relatively straightforwardly.

For example, we use industry level data on profitability and output to develop ratios of employment to output and employment to profitability. We then assume that the relationship is linear (and ignoring indivisibilities) we can use the assumed reduction in output to estimate a gross reduction in employment for the relevant industry.[9]

However, this is not the end of the story. Many of the individuals who are assumed to lose their jobs are likely to find employment elsewhere. However, these new jobs may offer lower wage levels[10], which will affect the amount of tax

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[9] This is similar to input-output analysis, for which detailed tables are available for some industries.

[10] Moreover, it is important not to discount the painful spell of unemployment these individuals will have experienced, which may have caused significant dislocations to their households.

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these individuals pay over the longer term.   We therefore need to make assumptions regarding:

- **The likely rate of re-employment:** estimates of long run rates of employment are used to identify the proportion of workers likely to find employment. Typically, one expects that the proportion of workers who remain unemployed would be low;

- **The period of time between jobs:** studies which examine average period between jobs could be used to inform this assumption. Again, this is likely to be relatively low (between 1-6 months) ; and

- **The likely reduction in salary levels for those who are re-employed.[11]** This is likely to vary by sector, for high–tech, high-value sectors it might be assumed that there would be a bigger drop in wages than in low–wage, low-value sectors. There is no good data source to inform this assumption, but the expectation would be that the wage reduction should be low (say 0-10%) Indeed, in competitive labour markets with few rigidities, it is likely that the reduction might well be very low. Because this assumption is not evidence based we have carried out sensitivity analysis by varying the assumed level of wage reduction.

Using the assumptions above it is possible to estimate the impact of reduced employment levels. This is done as follows.

- **All workers:** Using average wage data we use the assumption on period between jobs to identify the level of untaxed wages. Using appropriate income taxes one can calculate the direct loss in terms of tax revenue. Using information on the welfare system one can estimate the level of welfare that would likely be paid while the workers were seeking new employment.

- **Workers remaining unemployed:** For the proportion of workers that remain unemployed or exit the labour market, we make assumptions regarding the period of time they would have remained in employment and the wage level they would have received. We use data on average workforce age and wage levels to approximate this. We then apply appropriate income taxes rates to identify the loss of income tax. We also identify the average welfare payments that will have to be paid to these individuals.

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[11]   We assume wages will be lower in new jobs, because if not the individuals in question should have been working in those jobs to begin with.

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- **Workers finding employment:** For this group, the long term tax implication relates to the fact that they are likely to earn less than they would have done and so be in a position to pay less taxation. Using assumptions on average age, average wage and likely reduction in wage, one can estimate the loss of earnings to workers. Applying appropriate income taxes provides an estimate of the tax loss arising from this group of workers.

Summary

This section has set out a methodology for estimating the impact of counterfeiting on tax revenues and employment. It is important to highlight that developing these estimates relies on a series of assumptions not all of which can be evidence based. Most importantly assumptions must be made about both the level of counterfeiting and the impact on output levels of firms. Once these assumptions have been made, the methodology described above allows one to estimate the impact of reduced output on taxes and employments. It suggests that reduced output is likely to affect a range of government revenues and expenditures, including:

- sales tax;

- corporation tax;

- income taxes; and

- welfare payments.

Modelling Approach

This section provides a detailed description of the model we have developed to estimate the impact of counterfeiting on governments and consumers. In particular, it describes:

- the key elements of the model;

- the data sources we have relied on to populate the model; and

- the key assumptions contained within the model.

It is worth noting at the outset that this is a direct effects model. It captures only the direct impacts on governments and consumers associated with a reduction in the sales of genuine products. It does not seek to include impacts on other elements of the supply chain or multiplier effects of impact.

The rest of this section is structured as follows:

- key elements of the model;

- the model applied to Turkey.

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The economic model

The economic model used to estimate the impact of counterfeiting on governments and consumers on an industry by industry and country by country basis makes use of two modules or sets of calculations. These are outlined below.

Module 1: Industry impact

This module takes assumptions regarding the rate of counterfeit consumption into estimates of the effect of that consumption on industry turnover, profits and short and long-term unemployment.

The key driver of this module is the set of assumptions regarding counterfeiting consumption and the extent to which consumption of counterfeit products displaces sales of genuine products.

Unfortunately, there is limited data available regarding both absolute consumption levels of counterfeits and also about the degree of displacement. We have reviewed a range of existing national and international research on this topic for the industries concerned. We have been deliberately conservative to illustrate that even low rates of counterfeiting are associated with substantial harm to consumers and governments.

In terms of our approach, we have distinguished between those who purchase counterfeits knowingly and unknowingly. For those purchasing unknowingly we have assumed that a relatively high proportion of the products consumed displace genuine sales. We have not in all cases, however, assumed a 100% displacement rate. This is because counterfeits are typically somewhat cheaper than genuine products and even with unknowing purchases there is a need to take into account price elasticity effects. Survey evidence commissioned by BASCAP suggests that individuals tend to be fairly price sensitive with respect to these products.

We have assumed lower rates of displacement for knowing purchases of counterfeits, as it is less clear that such consumers would in fact purchase genuine products in the absence of counterfeits. Here, we have varied the rate depending on the product under consideration, to reflect the necessity of purchase. For example, we have assumed that displacement rates are lower for luxury goods than pharmaceuticals.

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Module 2: Tax and benefits

There are two components to this module. The business tax component estimates the effect of counterfeiting on government tax receipts from businesses. It takes the estimated impact of counterfeit products on turnover, profits and exports from the previous module as its starting point.

The income tax and benefits component of this module estimates the effect of counterfeiting on government tax receipts from individuals and benefit payments. It takes the estimated job losses and long-term unemployment from the previous module as its starting point.

Application to Turkey

This section describes how the economic model set out above has been used to generate estimates of the impact of counterfeiting on governments and consumers in Turkey.

Industry impact module

This module translates assumptions regarding the rate of counterfeit consumption into estimates of the effect of that consumption on industry turnover, profits and employment. Here we describe the assumptions and inputs that have been used to calculate the outputs for Turkey.

Assumptions regarding counterfeiting

Again, we have sought to be deliberately conservative in arriving at our assumptions regarding counterfeiting rates to illustrate that even low rates of counterfeiting are associated with substantial harm to consumers and governments[12].

Taking food and beverages, we have assumed that 2% of food and beverage products are counterfeit. As for the previous studies on the UK and Mexico, a small proportion of consumers are assumed to knowingly purchase counterfeit food and beverages but there are high displacement rates with a substantial proportion of consumers purchasing the genuine product in the absence of the counterfeit.

With regard to luxury goods, we have assumed that between 2% and 4% of products are counterfeits with only 40% of consumers who knowingly purchase counterfeit products consuming genuine products in the absence of the counterfeit.

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[12]   As some of the information drawn upon to develop estimated counterfeiting rates is commercially sensitive, we have not been able to report the exact rates used within this work for all product areas. We have been consistently conservative in our approach and, in particular, we have not made use of 100% displacement rates in our calculations.

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For pharmaceuticals, the overall reported rates of counterfeits tend to be low. Moreover, less industrial countries tend to have higher rates of counterfeit pharmaceuticals than developed countries: our estimates reflect this. We have assumed that a very low proportion of consumers knowingly purchase counterfeit pharmaceuticals and we assume that almost all of those that unknowingly purchase counterfeit pharmaceuticals would have purchased the genuine product.

Finally, for software, reported rates of counterfeits vary substantially from rates of a couple of percent up to 40% plus. To be conservative, we have assumed a figure at the lower end of this range. We have assumed a high displacement rate, but one that is less than 100%.

Other data inputs

There are two key data inputs to this module:

▫   data on industry specific turnover, profits and employment; and

▫   data on economy wide unemployment.

Data on industry specific turnover, profits and employment for Turkey for 2008 was collected from TurkStat, the Turkish Statistical Institute. The NACE[13] codes used for the four industries that have been analysed are set out in **Table 4**.[14]

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[13] [13]   NACE Codes are a pan-European classification system which group organisations according to their business activities. It assigns a unique 5 or 6 digit code to each industry sector.

[14]   In some cases, the code was felt to be too general to capture the relevant market so we have attempted to adjust for this where possible.

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Table 4. Turkey - NACE codes used to capture the four industries

Industry	NACE description	NACE code
Luxury goods	Manufacture of luggage, handbags and the like, saddlery and harness, Manufacture of footwear, Manufacture of perfumes and toilet preparations, Manufacture of watches and clocks, Manufacture of jewellery and related articles, Manufacture of leather clothes, Manufacture of other wearing apparel and accessories	19.2, 19.3, 24.52, 33.5, 36.2, 18.1, 18.2
Food and beverages	Production, processing and preserving of meat and meat products, Processing and preserving of fish and fish products, Processing and preserving of fruit and vegetables, Manufacture of vegetable and animal oils and fats, Manufacture of dairy products, Manufacture of grain mill products, starches and starch products, Manufacture of prepared animal feeds, Manufacture of other food products, Manufacture of beverages	15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9
Pharmaceuticals	Manufacture of basic pharmaceutical products, Manufacture of pharmaceutical preparations	24.41, 24.42
Software	Software Publishing Activities	72.21

Source: Eurostat, Frontier analysis

Industry data has also been used to estimate the impact of any reduction in turnover on industry employment and profits. The nature of the data available has meant that linear relationships between variables have been assumed.

Data on economy wide unemployment for Turkey was taken from the OECD[15] and is set out in Error! Reference source not found.**5**.

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[15] The figures relate to unemployment across the economy so are not specific to the four industries considered.

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Table 5. Turkey - length of unemployment

Length of unemployment	
<1 month	2.9%
1 – 3 months	25%
3 – 6 months	27%
6 – 12 months	20%
> 1 year but re-entry to labour force*	17%
Long-term unemployment with no re-entry to the labour force*	8%*

Source: OECD Stats, Frontier analysis

*No information on long-term unemployment without re-entry to the labour force was available. These figures of 17% and 8% have been assumed.

Outputs

The outputs from this module are:

▫   **An estimated reduction in industry turnover** – this is estimated by applying the assumptions regarding counterfeiting to industry turnover. The model operates in a static world[16], which means that estimates of lost output can be applied directly to industry turnover.

▫   **An estimated reduction in industry profits** – this is estimated by calculating the estimated reduction in profits that results from the reduction in turnover calculated above.

▫   **An estimated increase in short-term job losses and long-term unemployment –** this is estimated by calculating the estimated reduction in employment associated with the reduction in turnover calculated above. The impact on employment has been divided into a short-term and a long-term effect. The short-term impact captures the initial job displacement that occurs as a result of this level of counterfeit consumption. Longer term in an economy with low overall unemployment, many of those displaced will find alternative employment elsewhere, albeit at potentially lower wage rates. The long-term unemployment figures capture this effect.

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[16]   The static nature of the model involves an implicit assumption that producers do not change their behaviour in response to counterfeit production, for example by changing prices or advertising strategies.

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Tax and benefits module

This module takes the estimated impact of counterfeit products on turnover, profits, exports and employment from the previous module and translates them into the losses to the Turkish government tax receipts and increases to the Turkish government benefit payments.

Inputs

As well as the outputs from the previous module, this module uses information on tax rates in Turkey. These are set out in **Table 6**.

Table 6. Turkey - tax and benefit rates applied

	Rate assumed
Sales tax	18%
Corporation tax	17%
Individual taxes	23%
Benefit payments	$117 per week*

Source: Frontier analysis

* Weekly job seeker allowance payments for a single person, 2006 rates.

Outputs

The outputs from this module are:

- **An estimated reduction in VAT receipts** - information on turnover is used to estimate the impact on VAT receipts for government by applying the Turkish VAT rate of 18%.

- **An estimated reduction in corporation tax receipts** - information on profits is use to estimate the impact on corporation tax receipts by applying the Turkish corporation tax rate of 17%.

- **An estimated reduction in tax receipts from individuals** –the model estimates the reduced tax received from each unemployed individual during the period of unemployment. It also estimates the reduced tax that results from any reduction in earning power as a result of re-employment in a lower paid job[17].

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[17]   In an economy with close to full employment, individuals that are displaced as a result of counterfeiting may experience a reduction in their earnings when they become re-employed. This

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- □ **An estimated increase in benefit payments** - the model estimates the benefit payments made for each individual during the period of unemployment.

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reduction in earning power further depresses the income tax received by government. We have assumed a reduction in earning potential of 10%.

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