



# **The Impact of Counterfeiting on Governments and Consumers**

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# The Impact of Counterfeiting on Governments and Consumers

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## The Impact of Counterfeiting on Governments and Consumers

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## Preface

### **BASCAP quest for better information**

Better information on the scope, scale, costs and impacts of counterfeiting and piracy is critical to demonstrating the value of intellectual property to the economy and society more generally. Government leaders and influencers with better information on the value of Intellectual Property (IP) and a better understanding of how counterfeiting and piracy undermine IP, innovation, economic growth and employment are better able to prioritize public policy measures to protect IP and to work against the harms of counterfeiting and piracy.

Since counterfeiting operates outside the law, estimating the exact level of counterfeiting and the harm it brings is extremely challenging. Illegal businesses do not report any information on their activities to any government agency and therefore measures of the size of illegal businesses, such as total illegal sales or the income earned by these businesses must be estimated by indirect methods.

For this reason, BASCAP has commissioned a number of expert groups (including this report by Frontier Economics) to examine the issue and to develop methodologies for estimating the economic and social impacts. No one report or approach will yield a complete diagnosis or provide all the answers, but BASCAP is committed to learning from as many sources of expertise as possible.

With respect to this report, the methodology used to calculate these figures is as evidence-based as possible. It is based primarily on publicly available data from reputable sources such as national governments and the OECD, and is supplemented where necessary with data and analysis from industry associations and businesses.

In addition, given the limitations of information on counterfeiting, it has been necessary to make some assumptions. These assumptions have been based as far as possible on existing data. The assumptions used in this report are deliberately conservative both to ensure the findings are not over-stated and also to demonstrate that even on the most conservative set of assumptions counterfeiting and piracy still impose significant negative effects on governments and consumers.



## Executive Summary

Counterfeit and pirated goods can be found in almost every country in the world and in virtually all sectors of the global economy. These products are produced and sold in underground economies or in markets where they go unregulated and escape normal tax and tariff payments. They expose consumers to health, safety and quality risks and impose costs on society at large, in terms of employment, crime and social services.

Since counterfeiting operates outside the law, estimating the exact level of counterfeiting and the harm it brings is extremely challenging. Estimates of the level of counterfeiting vary but all estimates agree that counterfeiting represents a multi-billion Euro industry with hundreds of billions of Euros of counterfeit product moving across the globe every year.

The objective of this report is to develop a model based on publicly available data to estimate the cost to governments and consumers of counterfeit products. This is more than an academic exercise. An accurate measurement of the true costs of counterfeiting and piracy is a key factor in convincing government leaders and ultimately consumers that stronger action is needed to stop the flow of counterfeit goods. In the absence of reliable data, governments and consumers are left to conclude that the problem is not a priority or that it is a problem for the business sector alone to deal with.

Counterfeiting certainly impacts legitimate businesses, causing lost sales, lower profits and loss of brand trust and value. However, in an interconnected economy, consumers and governments also suffer. Governments see lower tax revenues and higher spending on welfare, health services and crime prevention. Consumers receive poorer quality products that are unregulated and unsafe. Moreover, as businesses suffer lower income and damaged brands, they may have to cut jobs and reduce investment leading in turn to lower economic growth.

These wider economic and social effects of counterfeiting and piracy are the primary focus of this report. It is anticipated that this report will help governments to understand that efforts to strengthen IP enforcement regimes should not be considered costs, but rather investments that pay tangible dividends to economic development and society.

### ***Building on the work of the OECD***

This study builds on recent work by the OECD to measure the cost of counterfeiting and piracy. The OECD concluded that the value of counterfeited and pirated goods moving through international trade alone equalled US\$200 billion annually. In releasing these findings, the OECD stated, “This total does not include the value of domestically produced and consumed counterfeit and

pirated products and the significant volume of pirated digital products being distributed via the Internet. If these items were added, the total magnitude of counterfeiting and piracy worldwide could well be several hundred billion dollars more.” In addition the OECD explained that counterfeiting and piracy “can have broader economy-wide effects on trade, foreign investment, employment, innovation, criminality, environment [...] and with respect to governments, counterfeiting and piracy have direct effects on tax revenues and government expenditures.”

Taken together, the OECD has delineated four categories of losses, for which they provided estimates for one - counterfeit and pirated goods moving through international trade.

- ▣ Category 1: counterfeit and pirated goods moving through international trade.
- ▣ Category 2: value of domestically produced and consumed counterfeit and pirated products.
- ▣ Category 3: the significant volume of pirated digital products being distributed via the Internet.
- ▣ Category 4: broader economy-wide effects.

More work must be done to estimate the economic and social impacts in each of these categories, as even the OECD’s estimates will need to be revised upwards to reflect more recent national customs agency statistics indicating a rise in border seizures over the figures used by the OECD in 2007. For example, seizures of counterfeit and pirated products are for some countries now twice the levels highlighted in the OECD reports. And while studies have been done to indicate that digital piracy and Internet sales of counterfeits may account for another US\$200 billion, little research has heretofore gone into estimating the value of domestically produced and consumed counterfeit and pirated products.

This report addresses Category 4 and investigates the impacts of counterfeiting and piracy on several – but not all – of the ‘broader economy-wide effects’, such as employment, lost tax revenues and higher government spending. It also assesses the impact of counterfeiting on consumers in terms of the health and safety risks they are exposed to and the increased levels of crime they face.

Given the measurement difficulties noted earlier, a new approach was needed to calculate these additional costs and impacts. The methodology used for this report is based upon an economic model that analyses the negative impact of counterfeiting and piracy on government receipts and expenditures, and the potential harm caused to consumers in two economies: Mexico and the UK; and across four sectors: luxury goods, pharmaceuticals, food and beverages and software. We then extrapolate these findings to illustrate the potential costs and impact across all G20 countries.

## Key findings

Counterfeiting and piracy are estimated to cost G20 governments and consumers over €100 billion every year. The G20 economies lose approximately €62 billion in tax revenues and higher welfare spending, €20 billion in increased costs of crime, €14.5 billion in the economic cost of deaths resulting from counterfeiting and another €100 million for the additional cost of health services to treat injuries caused by dangerous fake products. Finally, a number of G20 economies may be missing out on higher FDI as a result of concerns over IPR enforcement. That lost investment could give rise to additional tax losses of more than €5 billion across the G20. It should be noted that these estimates are for the G20 countries, and only address a portion of economic damages governments and consumers may experience.

Counterfeiting also has a big impact on employment across the G20 economies. The analysis suggests that approximately 2.5 million jobs have been destroyed by counterfeiting and piracy – alternatively, if counterfeiting and piracy could be eradicated or seriously reduced, up to 2.5 million jobs could be created in the legitimate economies of the G20. It should also be noted that these estimates do not include secondary impacts on employment that may well be experienced by suppliers, retailers and other sectors in the supply chain.

While it is likely that many of those who lost their jobs have gone on to find reemployment, the personal and family trauma associated with even temporary unemployment should not be lightly discounted. For example, 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. Even when workers do find new jobs, they are likely to pay less. Moreover, our estimates suggest that 160,000 workers will fail to find new jobs, with devastating consequences for their personal financial situations and harmful consequences for government as welfare bills rise and taxes fall.

- Counterfeiting and piracy cost the G20 economies approximately €62 billion annually in lost tax revenues and higher welfare spending. This is based on the analysis showing the cost in the UK of €4.1 billion and in Mexico of €1.4 billion.
- For the G20 overall, the economic and social costs of crime increases by more than €20 billion for every 1 % increase in the crime rate caused by the trade in counterfeit and pirated goods. In the UK a 1% increase in crime costs society approximately €1.7 billion, while in Mexico a 1% increase in crime leads to costs of €290 million.

- The economic cost of lives lost to counterfeiting and piracy can add up to €14.5 billion each year across the G20 economies, not including a cost for additional health services caused by dangerous fake products of more than €100 million each year.
- Lost taxes associated with lower FDI could be more than €5 billion per year. This is based on estimates of tax losses for Mexico of over €500 million.
- In the UK 380,000 jobs are destroyed as a result of counterfeiting with 31,000 workers unlikely to be able to find reemployment. In Mexico 480,000 jobs are destroyed with 26,000 unlikely to find alternative employment.

## Analytical approach

We have developed an economic model to estimate the costs of counterfeiting to governments and consumers. The model is based on a combination of publicly available data and assumptions.

The publicly available data is from reputable sources such as national governments and the OECD, and is supplemented where necessary with data and analysis from industry associations and businesses. The data relates to industry output and shares, profitability, employment, taxation and welfare payments.

We have based the assumptions used in the model on existing data and analysis where possible and have in all cases made the assumptions used as conservative as possible. The main body of the report sets out in detail the assumptions used in the analysis, the basis of those assumptions, and the impact that they have on our analysis. Over time, we hope that if this approach is implemented by policymakers and other stakeholders, the reliance on assumptions in developing estimates can be substantially reduced.

It is important to note that the model captures only the direct effects of counterfeiting on governments and consumers. It does not include any multipliers or attempt to estimate the wider employment or taxation effects that counterfeiting may give rise to.

The model has been developed so that it can be used by national governments, independent agencies, industry sector associations or any other bodies seeking to identify and examine the costs and impacts of counterfeiting. The model is designed, therefore, as a tool to be implemented on a country by country and industry by industry level; it is also expandable to analyze and estimate impacts on a regional or international basis.

In developing this model – and to demonstrate the usefulness of this approach -- we have applied the model to four sectors in two countries. The sectors chosen for analysis were luxury goods, pharmaceuticals, food and beverages and software. The countries chosen for analysis were the UK and Mexico.

The sectors were chosen on the grounds that they are representative of the types of sector in which counterfeiting is likely to occur, and because these sectors make up a substantial element of economic activity in both the UK and Mexico.

The UK and Mexico were chosen as they represent two large G20 countries, but two that differ enormously. The UK as a more developed economy is primarily a recipient of counterfeit products. Mexico, as a less developed economy, is a recipient of counterfeit products, but also may be exposed to other costs as a source of counterfeit products. For example, producing countries may suffer a loss of foreign direct investment over time as investors see a lack of evidence of government protection of intellectual property.

## Headline findings – UK

Applying our methodology to the four sectors (luxury goods, pharmaceuticals, food and beverages and software) in the UK we find that counterfeiting costs the government €500 million in lost taxes and higher welfare payments. This is made up of losses in sales tax, corporation tax and income tax and by increases in benefit payments.

To extrapolate these findings to the total UK economy, we based our estimate on the fact that these four industries account for 6% of UK GDP. However, we also accounted for the fact that these four sectors may be more prone to counterfeiting than the economy as a whole.<sup>1</sup> With this as the base, a conservative estimate of the cost for the UK economy as a whole could be in the order of €4.1 billion. For comparison, this is equivalent to 2.5% of total UK government tax receipts.

Another relevant comparison is the fact that €4.1 billion in lost tax revenue and increased welfare spending is more than 1.5 times what the UK currently spends in total on Customs activity. It also represents just less than half the UK's overseas aid commitment in 2010.

Because firms producing legitimate products lose sales to counterfeits, counterfeiting also has a big impact on employment. Approximately 15,000 jobs in the UK in the four sectors have been destroyed by the impact of counterfeits.

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<sup>1</sup> A simple scaling up from the four sectors to the economy as a whole would suggest a loss to government of approximately €8.2 billion. To account for the fact that the industries under consideration might be more prone to counterfeiting than the economy as a whole, the loss to government was discounted by 50%.

Alternatively, up to 15,000 jobs could be created if counterfeiting and piracy could be eradicated or significantly reduced. The impact of these losses on the government's tax receipts and benefit payments are captured above. While it is likely that many of those who lost their jobs have gone on to find reemployment, it is important to emphasise that even temporary unemployment can cause significant difficulties for those workers unfortunate enough to be made unemployed. Moreover, our estimates suggest that 1,200 workers will fail to find new jobs.

It is important to note again that these figures relate only to the four sectors we have analysed. A conservative estimate for the UK economy as a whole would be in the order of 380,000 jobs destroyed, and almost 31,000 workers unlikely to be able to find new jobs.

The links between counterfeiting and other forms of criminal activity are becoming better identified. There is widespread evidence that the huge profits from counterfeiting are used to fund other criminal activities. Obviously, we cannot measure this effect directly. However, even taking the most modest assumption that counterfeiting could be responsible for raising the UK crime rate by just 1%, the economic and social cost of crime in the UK would increase by €1.7 billion. This figure captures the cost imposed on the criminal justice system as well as other social costs such as the cost of lives lost (homicides) and the cost of insurance and security to protect against crime.

The €1.7 billion in additional cost represents more than 80% of total expenditures on the courts service in the UK and almost 5% of total expenditure on the criminal justice system in the UK.

In summary, conservative estimates suggest that counterfeiting costs the UK:

- €4.1 billion in lost taxes and higher welfare spending;
- 380,000 jobs destroyed with 31,000 individuals unlikely to be able to find new jobs; and
- €1.7 billion for every 1% increase in crime caused by counterfeiting.

## Headline findings – Mexico

In Mexico counterfeiting across the four sectors (luxury goods, pharmaceuticals, food and beverages and software) costs the government approximately €145 million per year. This loss is made up of losses in sales tax, corporation tax and income tax.

The four sectors account for approximately 8% of Mexican GDP. On conservative estimates, the total revenue impact for the Mexican government could be in the order of €1.4 billion or 1% of government tax receipts. This is

equivalent to 30% of what Mexico spends in pre-primary education or 10% in secondary education.

As with the UK, the impact of counterfeiting also affects employment. Across the four industries approximately 10,000 jobs have been destroyed with around 500 individuals unlikely to be able to find new jobs. Looking at the economy as a whole, the number of jobs destroyed is likely to exceed 480,000 with 26,000 of those who have lost their jobs unlikely to be able to find new jobs.

As well as losing tax receipts from Mexico-based companies as a result of counterfeiting, the Mexican government may also be missing out on significant tax payments from multinationals that would invest in the Mexican economy if there was stricter IPR enforcement. Technologically intensive sectors are the most likely to lose out on key technology transfer and foreign direct investment.

If better IPR enforcement could create the conditions that would attract foreign direct investment, this would have a clear impact on the output of the Mexican economy and on productivity. Estimates from recent academic work on the determinants of FDI suggest that for developing countries exports could increase by as much as 20% as a result of better IPR enforcement. For Mexico that would suggest an increase in total economic output of 11%. Even if we were to assume that Mexican output increased by only a more modest 2% in technologically intensive sectors, government tax receipts would still increase by around €520 million.

The cost to the economy and society of crime linked to counterfeiting is also significant in Mexico. If criminal activities linked to counterfeiting were to cause the crime rate to increase by just 1%, the total cost of crime in Mexico would increase by over €290 million.

In summary, conservative estimates suggest that counterfeiting costs Mexico:

- €1.4 billion in lost taxes and higher welfare spending;
- €520 million of tax losses from lost FDI;
- 480,000 jobs destroyed with 26,000 unemployed individuals unlikely to be able to find new jobs; and
- €290 million for every 1% increase in crime caused by counterfeiting.

## Illustrative findings - G20

This study has also considered what these findings could imply at a G20 level, deriving assumptions from the more focussed research conducted on the UK and Mexico.

Obviously, more accurate results would be generated by implementing the methodology for each of the G20 countries. However, to illustrate the potential

magnitude of the impact on government and consumers, we have extrapolated the findings of our analysis from the UK and Mexico to the G20.

Estimated on this basis, total estimated tax losses and increased expenditure across the member economies of the G20 could be in the order of €14 billion for the four sectors (luxury goods, pharmaceuticals, food and beverages and software) studied. Applying this approach to the G20 economies in their entirety, suggests that each year governments must find approximately €62 billion in order to cover tax losses and higher welfare spending.

For the four sectors analysed, around 540,000 jobs have been destroyed with 34,000 individuals who have lost their jobs unlikely to be able to find new jobs. For the G20 economies approximately 2.5 million have been destroyed, with 160,000 individuals unlikely to find re-employment. Again, it is important to emphasise that even temporary unemployment can cause significant difficulties for those workers unfortunate enough to be made unemployed.

The links between counterfeiting and other criminal activities may also be leading to substantial costs for the G20 governments and their citizens. For the G20 as a whole, the economic and social costs of crime increase by over €20 billion for every 1% increase in the crime rate caused by counterfeiting.

Finally, counterfeit products are unregulated and unsafe. Every year thousands of consumers living and working in countries throughout the G20 suffer accidents and injuries as a result of unregulated counterfeit products. Many, if not most, of these products have been purchased unwittingly by consumers. Unfortunately, 3,000 consumers lose their lives every year as a result of their exposure to dangerous counterfeit products (primarily through counterfeit food and medicines). On conservative assumptions, the economic cost of lives lost to counterfeiting can add up to €14.5 billion each year across the G20 economies.

Accidents and ill-health relating to counterfeiting also put a strain on health services across the G20. While there are few good sources of information on the total incidence of accidents and ill-health caused by counterfeiting, even the most modest assumptions suggests that across the G20 the costs to the health services are likely to exceed €100 million.

For the G20 as a whole therefore our analysis suggests that counterfeiting costs governments and consumers:

- approximately €62 billion annually in lost tax revenues and higher welfare spending;
- approximately 2.5 million jobs destroyed across the G20 countries with potentially as many as 160,000 individuals unlikely to find re-employment;
- €20 billion for every 1 % increase in the crime rate caused by the trade in counterfeit and pirated goods; and

- €14.5 billion each year as a result of the 3,000 deaths linked to counterfeit products, not including a cost for additional health services caused by dangerous fake products of more than €100 million each year.

## Recommendations

We have identified a number of key lessons and policy implications over the course of the study. These recommendations relate both to further data collection and analytical work that is required to improve the accuracy of estimates of harm caused by counterfeiting and some policy implications that emerge from the findings.

### Recommendations for improving the evidence base

#### 1. Improve the quality and scope of data relating to counterfeiting.

- **Data on consumer responses to counterfeiting:** We need greater information on the level of consumption of counterfeit products, the extent to which customers are knowingly purchasing counterfeit products, the drivers of purchasing such products and the degree to which consumers are substituting away from genuine products.
- **Health and safety effects of counterfeiting:** Governments collected only limited data on deaths associated with counterfeiting and almost no data on accidents and injuries associated with counterfeit products. Given the unsafe and unregulated nature of these products it is vital that better information is collected so that the public can be warned of the dangers, and also so that policy makers can have greater visibility of the costs counterfeiting is imposing.
- **The links between counterfeiting and other forms of crime:** Our study has demonstrated that even small increases in the crime rate can impose very high costs for society. Again, it is important that the relationship between counterfeiting and other forms of crime becomes better understood.
- **IPR protection and FDI:** Research into this area has demonstrated that developing countries may be losing out on substantial FDI as a result of a reputation for poor IPR enforcement. However, further work is required to fully flesh out and analyse the links between IPR enforcement and FDI in developing countries.

#### 2. Work with policy makers and stakeholders to refine the methodology set out in this study.

This study was completed in a relatively short space of time. We believe it provides a helpful starting place for measuring the effects on governments and consumers of counterfeiting. However, we would hope that over time feedback from policymakers and other stakeholders will help to refine and improve the methodology.

### **3. Implement the methodology in other sectors and countries.**

So far, this approach has been implemented for four sectors in the UK and Mexico. Results for the UK and Mexico economy as a whole and for the G20 have been extrapolated from these findings. In order to improve the robustness and accuracy of the findings, it will be necessary to implement this methodology for a wider set of sectors and countries.

### **4. Carry out a cost-benefit analysis of regulatory responses to counterfeiting.**

This study has identified substantial negative effects of counterfeiting for both consumers and government. It has not, and was not intended to, carry out a cost-benefit analysis of regulatory options for reducing counterfeiting. We suggest that this would be a valuable next step in the analysis

## **Policy recommendations**

As discussed above the focus of our work has been on quantifying the negative impacts of counterfeiting rather than analysing the potential cost effectiveness of regulatory responses. However, a number of implications can be drawn from our work in terms of potential policy responses:

### **5. Stepping up enforcement is likely to pay for itself.**

While a full cost-benefit analysis of regulatory actions to reduce counterfeiting would be required, the evidence in this report strongly suggests that such actions would be net beneficial. In the UK, for example, losses to government are more than double total expenditure on Customs activity. This doesn't account for the additional costs to society of higher crimes and deaths, accidents and ill-health. This suggests that greater enforcement activities that lead to even small reductions in levels of counterfeiting are likely to be net beneficial.

### **6. The penalties associated with counterfeiting should be reviewed.**

The potential cost of crime associated with counterfeiting could be between 5 and 10% of total expenditure on the criminal justice system. This suggests that stepping up the penalties associated with counterfeiting and the Courts' ability to deal effectively with IPR infringement cases could be net beneficial. We suggest that policy makers should consider whether Courts are adequately equipped to deal with these types of cases

and whether the penalties associated with counterfeiting and IPR infringements are proportionate to the harm they cause.

**7. Policymakers should consider the potential benefits of improving IPR enforcement in developing economies.**

It has often been suggested that IPR enforcement retards progress in developing countries, and that such countries simply cannot afford to crack down on IPR enforcement. However, the analysis we have reviewed suggests that this may not be the case, and that developing economies may be missing out on vital FDI and technology transfer because of their limited approach to IPR enforcement.



## 2 Introduction

Counterfeit and pirated goods can be found in almost all sectors of the economy. These products are produced and sold in underground economies or in markets where they go unregulated and escape normal tax and tariff payments. They expose consumers to health, safety and quality risks and impose costs on society at large, in terms of employment, crime and social services.

Since counterfeiting operates outside the law, estimating the exact level of counterfeiting and the harm it brings is extremely challenging. Estimates of the level of counterfeiting vary but all estimates agree that counterfeiting represents a multi-billion Euro industry with hundreds of billions of Euros of counterfeit product moving across the globe every year.

The most recent work by the OECD concluded that the value of counterfeited and pirated goods moving through international trade alone equalled US\$200 billion annually. In releasing these findings, the OECD stated, “This total does not include the value of domestically produced and consumed counterfeit and pirated products and the significant volume of pirated digital products being distributed via the Internet. If these items were added, the total magnitude of counterfeiting and piracy worldwide could well be several hundred billion dollars more.”

Taken together, the OECD has delineated four categories of losses, for which they provided estimates for one – counterfeit and pirated goods moving through international trade.

- ▣ **Category 1:** counterfeit and pirated goods moving through international trade;
- ▣ **Category 2:** domestically produced and consumed counterfeit and pirated products;
- ▣ **Category 3:** the significant volume of pirated digital products being distributed via the Internet; and
- ▣ **Category 4:** broader economy-wide effects.

More work must be done to estimate the economic and social impacts in each of these categories, as even the OECD’s estimates will need to be revised upwards to reflect more recent national customs agency statistics. These indicate a rise in border seizures over the figures used by the OECD in 2007. For example, seizures of counterfeit and pirated products are for some countries now twice the levels highlighted in the OECD report. And while studies have been done to indicate that digital piracy and Internet sales of counterfeits may account for another US\$200 billion, little research has heretofore gone into estimating the value of domestically produced and consumed counterfeit and pirated products.

In this regard, the International Chamber of Commerce (ICC) commissioned Frontier Economics (Frontier) to develop and implement a methodology to address Category 4, the broader economy wide effects. This report focuses on several – but not all – of the broader economy-wide effects, such as employment, lost tax revenues and higher government spending. It also assesses the impact of counterfeiting on consumers in terms of the health and safety risks they are exposed to and the increased levels of crime they face.

There were two stages to the work undertaken by Frontier on behalf of the ICC:

- Stage 1 – develop a framework for analysing and estimating the negative effects of counterfeiting on governments and consumers; and
- Stage 2 – develop and implement a model based on publicly available data and assumptions that can be used by national governments, independent agencies, industry sector associations or any other bodies seeking to identify and examine the costs and impacts of counterfeiting.

This report focuses on the second of these stages – modelling the negative effects of counterfeiting and piracy on governments and consumers. In developing this model – and to demonstrate the usefulness of this approach – we have applied the model to four sectors in two countries. The sectors chosen for analysis were luxury goods, pharmaceuticals, food and beverages and software. The countries chosen for analysis were the UK and Mexico.

In the remainder of this report we set out in detail the analytical framework underpinning the model, a detailed description of the model and the key findings generated by the model for the UK and Mexico, and illustrative findings for the G20 economies. The report is structured as follows:

- **Section 2** sets out the high-level analytical framework underpinning our analysis.
- **Section 3** provides a detailed description of the model we have developed, the data sources used to populate the model and the assumptions underpinning it.
- **Section 4** provides the key findings from the analysis, including an assessment of the sensitivity of the analysis to changes in the key assumptions.
- **Section 5** presents key lessons and recommendations.

## 3 Analytical framework

The following chapter provides a detailed description of the model we have developed to estimate the harm to governments and consumers caused by counterfeiting. Before doing so, this chapter sets out the economic framework we have used to guide our model development.

The chapter is structured as follows:

- definition of counterfeiting and the counterfactual; and
- approach to estimating measures of harm.

### 3.1 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 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.

## 3.2 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. 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;
- FDI – lax IPR enforcement in developing countries may reduce levels of FDI and technology transfer;
- Criminality/organised crime – counterfeiting is linked strongly to organised crime. If the proceeds of counterfeiting are used to fund other criminal activities this will impose additional economic and social costs of crime on society; and
- Health and safety – counterfeit products are unsafe and unregulated. Every year consumers using such products are at risk of harm or even death – approximately 3,000 deaths per year are attributed to 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.

### 3.2.1 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.

- **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.<sup>2</sup>

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<sup>3</sup>, which will affect the amount of tax 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.**<sup>4</sup> 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

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<sup>2</sup> This is similar to input-output analysis, for which detailed tables are available for some industries.

<sup>3</sup> 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.

<sup>4</sup> 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.

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.
- **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.

## 4 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.

Additionally, the chapter sets out the methodology used to extrapolate findings at a national economy level and a G20 economy level from our sectoral analysis of the UK and Mexico. The G20 findings are provided primarily to illustrate the magnitude of effects that counterfeiting and piracy may give rise to. However, the estimates necessarily rely on quite strong assumptions about the degree of uniformity in counterfeiting rates across countries. As a consequence, we have tried to make the estimates as conservative as possible, and we fully recognise that it will be desirable in the future to roll out the methodology to other sectors and countries in order to minimise future reliance on assumptions in carrying out this type of analysis.

Finally, 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 the UK;
- the model applied to Mexico; and
- extrapolating findings to the national economy and G20 economy.

### 4.1 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 five 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 also provided questionnaires to a number of firms in the sectors we were examining, and we reviewed primary consumer survey evidence commissioned by BASCAP. This evidence suggests levels of counterfeiting higher than those assumed within our model. 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.

### **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.

### **Module 3: Crime**

The links between counterfeiting and other forms of criminal activity are becoming better established. However, it is not possible within the confines of current data to isolate the crimes linked to counterfeiting and estimate the economic and social costs they impose.

To illustrate the possible effect of counterfeiting on crime, the crime module estimates the impact of a given increase in the crime rate on the costs of crime for the country concerned. The increase in the crime rate can be varied but under conservative assumptions, it aims to reflect the likely impact of counterfeiting on economic and social costs.

### **Module 4: Foreign Direct Investment**

The Foreign Direct Investment module estimates the potential loss to country output, and subsequently to government tax receipts and employment that occurs as a result of lax intellectual property enforcement within a country. This module is applied only to less developed economies.

The calculations within the module are based on a recent NBER working paper<sup>5</sup>. This paper provides a range of estimates of the effect that poor IPR enforcement has on a developing economy. In particular, it focuses on the increase in the southern based production of multinational companies that occurs when less developed economies tighten up their IPR enforcement. The paper reports findings of an observed increase in exports of around 20% for less developed economies that tighten up on IPR. This increase is focused in four technologically intensive sectors: electrical machinery, industrial chemicals, professional and scientific equipment and transportation equipment.

The model applies a boost to export levels to represent the improvement that would occur as a result of improved IPR enforcement. This is translated into an increase in turnover, assuming that the exports are completely additional and do not displace current domestic production within the industry. The industry impact module and tax and benefits modules have been used to translate the effect on turnover into the impact on government tax receipts and benefit payments and employment.

### **Module 5: Health**

The health module has two components. The first estimates the social loss that occurs as a result of individuals dying because of a counterfeit product. The second component assesses the cost to the health service of caring for individuals taken ill or injured as a result of purchasing counterfeit products. Due to data

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<sup>5</sup> Branstetter et al (2007), "Intellectual Property Rights, Imitation, and Foreign Direct Investment: Theory and Evidence", NBER Working Paper 13033

availability, calculations forming part of the health module have only been possible at the G20 level. The calculations are covered under the G20 grossing up section below.

The sections that follow describe the detailed application of all but the health module to the UK and to Mexico.

## 4.2 Application to the UK

This section sets out how the economic model above has been used to generate estimates of the impact of counterfeiting on governments and consumers in the UK. The UK model makes use of three out of five of the modules set out above:

- the industry impact module;
- the tax and benefits module; and
- the crime module.

Each module is described in detail below.

### 4.2.1 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 the UK.

#### ***Assumptions regarding counterfeiting***

As discussed above, we reviewed extensive materials in identifying the appropriate levels of counterfeiting, and have sought to use conservative, but realistic levels of consumption. We have been deliberately conservative within our modelling work to illustrate that even low rates of counterfeiting are associated with substantial harm to consumers and governments<sup>6</sup>.

Taking food and beverages, for example, “Which?” a publication from a leading UK consumer rights group estimates that as many as 10% of food and beverage products in the UK may be counterfeit. We have assumed a substantially more conservative 2%. A small proportion of consumers are assumed to knowingly purchase counterfeit food and beverages but there are high displacement rates

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<sup>6</sup> 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.

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: 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 the UK for 2007 was collected from Eurostat. The NACE<sup>7</sup> codes used for the four industries that have been analysed are set out in **Table 1**.<sup>8</sup>

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<sup>7</sup> 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.

<sup>8</sup> 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.

**Table 1. UK - NACE codes used to capture the four industries**

Industry	NACE description	NACE code
<b>Luxury goods</b>	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, 24.5, 2, 33.5, 36.2, 18.1, 18.2
<b>Food and beverages</b>	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 other food products, Manufacture of beverages	15.1, 15.2, 15.3, 15.4, 15.5, 15.8, 15.8
<b>Pharmaceuticals</b>	Manufacture of basic pharmaceutical products, Manufacture of pharmaceutical preparations	24.41, 24.42
<b>Software</b>	Software <sup>9</sup>	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 the UK was taken from the OECD<sup>10</sup> and is set out in **Table 2**.

<sup>9</sup> Data was only available for K72 (computer related activities). In order to estimate these figures for K 72.21 (software), an adjustment factor based on the US was used.

<sup>10</sup> The figures relate to unemployment across the economy so are not specific to the four industries considered.

**Table 2. UK - length of unemployment**

Length of unemployment	
<1 month	16%
1 – 3 months	23%
3 – 6 months	19%
6 – 12 months	17%
> 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. The figure of 8% has been assumed.

## Outputs

The outputs from this module are:

- **An estimated reduction in industry turnover** – this is estimated by applying the assumptions regarding counterfeiting set out to industry turnover. The model operates in a static world<sup>11</sup>, which means that estimates of lost output can be applied directly to industry turnover to give an implied reduction in 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.
- **Estimated 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 job loss effect and a long-term

<sup>11</sup> 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. While this assumption is unlikely to hold in the long term, it is necessary to make the analysis tractable.

unemployment 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.

#### 4.2.2 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 UK government tax receipts and increases to UK government benefit payments.

##### *Inputs*

As well as the outputs from the previous module, this module uses information on tax and benefit rates in the UK. These are set out in **Table 3**.

**Table 3. UK - tax and benefit rates applied**

	Rate assumed
<b>Sales tax</b>	15%
<b>Corporation tax</b>	28%
<b>Individual taxes</b>	40%***
<b>Benefit payments</b>	€190 per week****

Source: Frontier analysis

\*\* For simplification, we have assumed that all companies pay the main rate of corporation tax.

\*\*\* This assumes that the individual is a lower rate tax payer and covers income tax, National Insurance contributions, lower VAT on purchases and council taxes

\*\*\*\* Weekly job seeker allowance payments for a single person, housing benefit for a single person aged 15 to 59 and average weekly council tax benefit

##### *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 UK VAT rate of 15%.

- **An estimated reduction in corporation tax receipts** - information on profits is used to estimate the impact on corporation tax receipts by applying the corporation tax rate of 28%.
- **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<sup>12</sup>. While the unemployment effect is one-off we have annualised the impact.
- **An estimated increase in benefit payments** - the model estimates the benefit payments made for each individual during the period of unemployment.

### 4.2.3 Crime module

This module illustrates the effect of a small percentage increase in the crime rate in the UK on the economic and social costs of crime.

#### *Inputs*

The core input to this module is an estimate of the social and economic cost of crime in the UK. This estimate is provided by the Home Office<sup>13</sup>. The economic and social cost of crime for the period 1999-2000 for England and Wales was estimated by the Home Office to be approximately €80 billion. We have estimated the cost of crime for 2008 to be around €150 billion<sup>14</sup>.

This estimate captures a wider set of costs than those associated with the criminal justice system alone. It also captures the cost of crime in terms of lives lost (homicides) as well as costs incurred in anticipation of crimes occurring (such as security and administration costs) and as a consequence of criminal events (such as property stolen and damaged, emotional and physical impacts and health services).

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<sup>12</sup> 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 reduction in earning power further depresses the income tax received by government. We have assumed a reduction in earning potential of 10%.

<sup>13</sup> Home Office Research Study 217, The economic and social costs of crime, Sam Brand and Richard Price.

<sup>14</sup> This reflects a lower crime rate but higher prices.

## Outputs

The output of this module is an estimate of the effect on the economic and social cost of crime for a given percentage increase in the crime rate. The percentage increase can be varied within the model, but for the purposes of the results section that follows we have applied a percentage increase of 1%.

To calculate the effect of a 1% increase in the crime rate we apply the increase to the current crime rate (the number of crimes per head of population) of 19%. We can estimate the increase in the number of crimes that this would imply. An average economic and social cost per crime is applied to the number of additional crimes to calculate the total increase in social and economic cost.

## 4.3 Application to Mexico

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 Mexico. The Mexican model makes use of four out of five of the modules set out above:

- the industry impact module;
- the tax and benefits module;
- the crime module; and
- the foreign direct investment module.

Each module is described in detail below.

### 4.3.1 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 Mexico.

#### *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<sup>15</sup>.

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<sup>15</sup> 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.

Taking food and beverages, we have assumed that 2% of food and beverage products are counterfeit. As for the UK, 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. Moreover, developing 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 Mexico for 2006 was collected from Banco de Información Económica, Mexico. The NAICS<sup>16</sup> codes used for the four industries that have been analysed are set out in **Table 4**.<sup>17</sup>

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<sup>16</sup> The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. It is comparable to the NACE system used throughout Europe.

<sup>17</sup> 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.

**Table 4. Mexico - NAICS codes used to capture the four industries**

Industry	NAICS description	NAICS code
<b>Luxury goods</b>	Footwear, Manufacture of perfumes and cosmetics, Manufacture of watches and clocks, Manufacture of jewellery, Wearing apparel, Manufacture of leather clothes, Others (handbags, luggage, etc)	316.2, 325.62, 334.5191, 339.912, 315.1, 315.2, 18.1, 316.9,
<b>Food and beverages</b>	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 sugar, chocolate, sweets and similars, 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	311.6, 311.7, 311.4, 311.3, 311.5, 311.2, 311.1, 311.9, 312.1
<b>Pharmaceuticals</b>	Manufacture of basic pharmaceutical products, Manufacture of pharmaceutical preparations	325.411, 325.412
<b>Software</b>	Software <sup>18</sup>	511.2

Source: Banco de Información Económica, Mexico, 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 Mexico was taken from the OECD<sup>19</sup> and is set out in **Table 5**.

<sup>18</sup> The figures above are taken from Banco de Información Económica – Mexico. The original figures were for 2003. These have been uprated for inflation to 2006 and then transferred into Euros.

<sup>19</sup> The figures relate to unemployment across the economy so are not specific to the four industries considered.

**Table 5. Mexico - length of unemployment**

Length of unemployment	
<1 month	38%
1 – 3 months	41%
3 – 6 months	16%
6 – 12 months	3%
> 1 year	3%

Source: OECD Stats, Frontier analysis

### 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<sup>20</sup>, 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.

<sup>20</sup> 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.

### 4.3.2 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 Mexican government tax receipts and increases to the Mexican government benefit payments.

#### *Inputs*

As well as the outputs from the previous module, this module uses information on tax rates in Mexico. These are set out in **Table 6**. Information on benefits for Mexico was unavailable. Benefit payments have therefore been excluded from the model.

**Table 6. Mexico - tax rates applied**

	Rate assumed
<b>Sales tax</b>	15%
<b>Corporation tax</b>	23%
<b>Individual taxes</b>	27%

Source: World Bank

#### *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 Mexican VAT rate of 15%.
- **An estimated reduction in corporation tax receipts** - information on profits is use to estimate the impact on corporation tax receipts by applying the corporation tax rate of 23%.
- **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<sup>21</sup>.

### 4.3.3 Crime module

This module illustrates the effect of a small percentage increase in the crime rate in Mexico on the economic and social costs of crime.

#### Inputs

The core input to this module is an estimate of the social and economic cost of crime in Mexico. The estimate was taken from "The Social Costs of Crime in Mexico City and Suburban areas" by R Villoro and G Teruel<sup>22</sup>. They present the social cost of crime as a proportion of GDP for Mexico City and the suburban area. They report a figure of 3.6% for 1998.

The 3.6% figure includes the cost of lives lost (homicide) and government expenditure on crime prevention. A further figure of 8.1% is also quoted. This includes property transfer costs. Neither figure includes expenditure of private firms on security, other victim costs or costs borne by non victims. The authors regard the figure of 3.6% to be at the lower bound. To be conservative, we have taken the figure of 3.6% of GDP to represent the cost of crime across the whole of Mexico. This also assumes that the cost of crime has remained a constant fraction of GDP since 1998.

#### Outputs

The output of this module is an estimate of the effect on the economic and social cost of crime for a given percentage increase in the crime rate. The percentage increase can be varied within the model, but for the purposes of the results section that follows we have applied a percentage increase of 1%.

To calculate the effect of a 1% increase in the crime rate we apply the increase to the current reported crime rate (the number of crimes per head of population) of 2<sup>23</sup>%. We can estimate the increase in the number of crimes that this would

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<sup>21</sup> 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 reduction in earning power further depresses the income tax received by government. We have assumed a reduction in earning potential of 10%.

<sup>22</sup> "The Social Costs of Crime in Mexico City and Suburban areas" by R Villoro, George Washington University, G Teruel Universidad Iberoamericana, Estudios Economicos 2003.

<sup>23</sup> The Crime rate figure is taken from the United Nations Office on Drugs and Crime Survey response for Mexico. The publication reports figures for 2005 and 2006 for the whole country. The 2006 crime rate figures have been used and multiplied by the total population of Mexico for 2006. We have assumed that the crime rate has remained stable since 2006.

imply. An average economic and social cost per crime is applied to the number of additional crimes to calculate the total increase in social and economic cost.

#### 4.3.4 Foreign Direct Investment module

This module estimates the potential loss to country output, and subsequently to government tax receipts and employment that occurs as a result of lax intellectual property enforcement within a country.

##### *Inputs*

Information on the current level of exports, turnover and employment in each of the four technologically intensive sectors highlighted by the NBER study has been collected. This information was available from the Banco de Información Económica, Mexico. The NAIC codes used are:

- electrical machinery – code 335;
- industrial chemicals – code 325;
- professional and scientific equipment – codes 334 and 339 1; and
- transportation equipment – code 336 .

The module applies an assumption regarding the dampening effect that poor IPR enforcement has on Mexican exports. The paper reports an increase in exports of around 20%, but to be conservative, the results presented in this paper assume exports would increase by just 5%.

##### *Outputs*

The effect on exports is translated into impacts on turnover, profit and employment using the calculations contained within the industry impact module. These can be translated into the effect on government tax receipts using the tax and benefits module. The outputs from this module are:

- **An estimated reduction in VAT receipts as a result of lax IPR enforcement** - information on turnover is used to estimate the impact on VAT receipts for government by applying the Mexican VAT rate of 15%.
- **An estimated reduction in corporation tax receipts as a result of lax IPR enforcement** - information on profits is used to estimate the impact on corporation tax receipts by applying the corporation tax rate of 23%.
- **An estimated reduction in tax receipts from individuals as a result of lax IPR enforcement** –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<sup>24</sup>.

## 4.4 Extrapolating results to national economies and to the G20

The sections above outline how the economic model we have developed has been applied to the four industries in two G20 countries, UK and Mexico. This methodology can be applied on an industry by industry and country by country basis.

To provide an illustration of possible effects at a national level for the UK and Mexico and across the G20 we have extrapolated the findings from our analysis on taxes and benefits, employment, crimes and foreign direct investment. We have also carried out some analysis of health effects at the G20 level as it has not been possible to disaggregate these effects to individual G20 economies. This section reports the calculations that have been carried out.

### 4.4.1 National grossing up of tax, benefit, employment, crime and foreign direct investment

We have extrapolated from the findings for the four sectors to identify 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 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.
- For employment impacts we have followed a similar methodology. 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.

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<sup>24</sup> 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 reduction in earning power further depresses the income tax received by government. We have assumed a reduction in earning potential of 10%.

#### 4.4.2 G20 grossing up of tax, benefit, employment, crime and foreign direct investment

##### *Tax and benefits, FDI and employment effects*

We divided the G20 economies into those that are developed and those that could be classified as developing. Where possible we identified estimates of industry output for each sector in each of the relevant G20 countries. We then applied the appropriate UK and Mexico estimates.

To get a G20 figure across all industries, we have taken industry turnover for the four industries as a percentage of GDP (11%). We have multiplied the G20 figure for the four industries by a factor of 9 (100/11). To account for the fact that the industries under consideration may be more prone to counterfeiting than the economy as a whole, we have discounted the loss by 50%.

#### 4.4.3 G20 Health module

The health module has two components. The first estimates the social loss that occurs as a result of individuals dying because of a counterfeit product. The second component assesses the cost to the health service of caring for individuals taken ill or injured as a result of purchasing counterfeit products.

##### *Inputs*

There are three main inputs to this module:

- data on the number of individuals that have died, become ill or been injured as a result of purchasing a counterfeit product;
- estimates of the social value of an individual life lost; and
- estimates of the cost of care within the health service.

##### *Outputs*

##### *The value of lives lost*

The starting point for this component is information on the number of individuals that have died as a result of purchasing a counterfeit product. These numbers are combined with an estimate of the social value of each individual life lost to society. Such value estimates are used widely by governments for cost-benefit analysis and regulatory decision making.

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 have created flexibility within the model to vary the value that is used.

### ***The cost to the health service***

Some of the individuals that become ill or have an accident as a result of purchasing a counterfeit product are likely to require medical treatment. This medical treatment may impose a cost on the health service of the country where the individual seeks treatment. In the short term, unless there are a significant number of cases at once, the cost imposed may be small. Most costs within the health service are likely to be fixed in the short term: staff are employed and will deal with whatever volume of patients arrive and buildings are fixed. There may be some costs incurred as a result of using consumables such as medicines. However, longer term, if there is a continued risk of such cases the health service may be forced to increase its capacity to be able to deal with them.

In the UK, the National Health Service collects information on the average cost of each visit to accident and emergency and also the cost of a day spent in a hospital bed. These are indicative of the resource cost associated with medical treatment such as that which might be incurred as a result of consuming a counterfeit product. These costs have been applied to estimates of the number of such trips to hospital that occur as a result of counterfeit products to provide estimates of the cost to the health service. Given the difficulties surrounding estimates of this nature, these calculations are meant to be illustrative of the type of analysis that would be possible if better data on accidents and illnesses occurring as a result of counterfeit products were available.



## 5 Key findings

This chapter sets out the key findings from the model described in the previous chapter. It provides detailed findings in relation to tax losses, employment effects and increased spending for both the UK and Mexico. It also extrapolates from the findings to provide illustrative estimates of the potential magnitude of effects for the G20 economies.

The chapter is structured as follows:

- Section 5.1 provides key findings for the UK;
- Section 5.2 provides key findings for Mexico;
- Section 5.3 provides illustrative findings for the G20; and
- Section 5.4 discusses the sensitivity of the analysis to changes in the key assumptions.

### 5.1 Key findings for the UK

As described in the previous chapter, our analysis of the impact of counterfeiting in the UK is based on four sectors – luxury goods, pharmaceuticals, food and beverages and software. We have developed sector based estimates of:

- tax losses (broken down by category);
- increased welfare spending; and
- employment effects.

Using the findings for these sectors, we have extrapolated estimates of impact on the same categories for the UK economy as a whole. Additionally, we have examined the potential costs that may be imposed on society as a result of the links between counterfeiting and other forms of crime.

#### 5.1.1 Sectoral findings

**Table 7** below sets out the key impacts on taxes and welfare payments for the four sectors in the UK. The Table shows that the total loss to the government across the four sectors is approximately €500 million. The largest element of the loss is a reduction in business taxes. Income tax losses and benefit payments are low because of the assumptions that workers find re-employment relatively quickly.

**Table 7. Impact on UK - tax receipts and benefit payments**

<b>Tax receipt/benefit payment*</b>	<b>Impact</b>
Business taxes**	€434 million
Income tax	€48 million
Benefit payments	€15 million
<b>Total</b>	<b>€497 million</b>

Source: Frontier analysis

\*Rounded to the nearest million. Totals may not sum exactly due to rounding.

\*\*Includes sales tax and corporation tax

We have split employment effects into 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.

While these jobs are lost across the four sectors, it is not appropriate to assume that unemployment rises by that amount. In a low unemployment economy, we would expect the majority of those that lose their jobs to find alternative employment within a reasonably short period of time. However, the personal and family trauma associated with even temporary unemployment should not be lightly discounted. For example, 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.

The long term unemployment figure therefore refers to those workers in the four sectors that are likely to remain unemployed for greater than 1 year. We find that around 15,000 jobs across the four sectors would be destroyed, and of those workers losing their jobs, we would expect 1,200 to remain in unemployment after 1 year.

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.

## 5.1.2 Economy-wide findings

### *Tax, welfare and employment effects*

As described in the previous chapter, we have extrapolated from the findings for the four sectors to identify 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 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.
- For employment impacts we have followed a similar methodology. 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 have identified the following economy wide effects of counterfeiting and piracy:

- Lost taxes and higher welfare payments cost the government approximately €4.1 billion; and
- An estimated 380,000 jobs are destroyed across the economy, with 31,000 individuals unable to find alternative employment .

### *Cost of crime*

In addition to the direct effects on government, in line with the OECD methodology we have also considered the potential for counterfeiting to increase the cost of crime facing society. The links between counterfeiting and other forms of criminal activity are becoming better identified. There is widespread evidence that the huge profits from counterfeiting are used to fund other criminal activities. Obviously, we cannot measure this effect directly.

However, even taking the most modest assumption that counterfeiting could be responsible for raising the UK crime rate by just 1%, the economic and social cost of crime in the UK would increase by €1.7 billion. This figure captures the cost imposed on the criminal justice system as well as other social costs such as the cost of lives lost (homicides) and the cost of insurance and security to protect against crime.

The €1.7 billion in additional cost represents more than 80% of total expenditures on the courts service in the UK and almost 5% of total expenditure on the criminal justice system in the UK.

### Summary

In summary, conservative estimates suggest that counterfeiting costs the UK:

- €4.1 billion in lost taxes and higher welfare spending;
- An estimated 380,000 jobs are destroyed with 31,000 unable to find new jobs; and
- €1.7 billion for every 1% increase in crime caused by counterfeiting.

## 5.2 Key findings for Mexico

As for the UK, we have developed sector based estimates of:

- tax losses (broken down by category);
- increased welfare spending; and
- employment effects.

Using the findings for these sectors, we have extrapolated estimates of impact on the same categories for the Mexican economy as a whole. Additionally, we have examined the potential costs that may be imposed on society as a result of the links between counterfeiting and other forms of crime.

Finally, and unlike for the UK, we have considered the potential gains to the Mexican economy if strong IPR enforcement were to lead to increased technology transfer and Foreign Direct Investment (FDI).

### 5.2.1 Sectoral findings

**Table 8** below sets out the impact on Mexican government revenues associated with counterfeiting. The table shows that for the four sectors total losses would equate to €221 million. The bulk of losses come from business taxes. We have not identified any significant increase in welfare payments.

**Table 8. Impact on Mexico - tax receipts and benefit payments**

Tax receipt/benefit payment*	
Business taxes**	€212 million
Income tax	€8 million
Benefit payments	N/A
<b>Total</b>	<b>€221 million</b>

Source: Frontier analysis

\*Rounded to the nearest million. Totals may not sum exactly due to rounding.

\*\*Includes sales tax and corporation tax

As with the UK, we have distinguished between short-term employment effects and permanent reductions in employment. The analysis shows that in total almost 10,000 jobs would be destroyed, with 500 individuals unable to find reemployment. Again, 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.

## 5.2.2 Economy wide findings

### *Tax, welfare and employment effects*

Using the same methodology as described above for the UK, we have identified aggregate tax welfare and employment effects on the Mexican economy.

The total revenue impact for the Mexican government could be in the order of €1.4 billion or 1.5% of government tax receipts. Around 480,000 jobs are likely to be destroyed with 26,000 individuals unable to find alternative employment.

### *Losses due to reduced 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. A

recent paper by the NBER<sup>25</sup> analyses the net impact of IPR reforms in a number of countries. The work finds 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.

We have used the findings from this work to estimate the potential gains to the Mexican economy of stepping up IPR enforcement. If better IPR enforcement could create the conditions that would attract foreign direct investment, this would have a clear impact on the output of the Mexican economy and on productivity.

Estimates from the academic work described above suggest that for developing countries, exports could increase by as much as 20% as a result of better IPR enforcement. For Mexico that would suggest an increase in total economic output of 11%. Even if we were to assume that Mexican output increased by only a more modest 2% in technologically intensive sectors, government tax receipts would still increase by around €520 million.

### **Cost of Crime**

The cost to the economy and society of crime linked to counterfeiting is also significant in Mexico. If criminal activities linked to counterfeiting were to cause the crime rate to increase by just 1%, the total cost of crime in Mexico would increase by over €290 million.

### **Summary**

In summary, conservative estimates suggest that counterfeiting costs Mexico:

- €1.4 billion in lost taxes and higher welfare spending;

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<sup>25</sup> Branstetter et al (2007), ‘Intellectual Property Rights, Imitation, and Foreign Direct Investment: Theory and Evidence’, NBER Working Paper 13033

- €520 million of tax losses from lost FDI;
- 480,000 jobs destroyed with 26,000 individuals unlikely to find new jobs; and
- €290 million for every 1% increase in crime caused by counterfeiting.

### 5.3 Illustrative findings for the G20

We have carried out detailed analysis for four sectors in the UK and Mexico, and have extrapolated those findings to a national economy level. Additionally, we have also used the findings from the work to highlight the level of impact that counterfeiting might be giving rise to at a G20 level.

Given that we only have data points for four sectors and two economies this analysis should only be considered as illustrative of the size of effect that counterfeiting may be giving rise to. We would hope that if the methodology is rolled out to other countries and sectors we can in time form estimates for the G20 economies that are less reliant upon, and sensitive to, the assumptions we must make.

With that in mind (and as described in the previous section) we have taken a robust approach to extrapolating findings for the G20 economies. In particular, we have applied a discount rate of 50% to the impacts we identify on government receipts and expenditures.

Estimated on this basis, total estimated tax losses and increased expenditure across the member economies of the G20 could be in the order of €14 billion for the four sectors (luxury goods, pharmaceuticals, food and beverages and software) studied. Applying this approach to the G20 economies in their entirety, suggests that each year governments must find approximately €62 billion in order to cover tax losses and higher welfare spending.

Around 540,000 jobs could be destroyed and 34,000 unemployed individuals unable to find new jobs across the four sectors analysed. For the G20 economies as a whole approximately 2.5 million jobs could be destroyed, with 160,000 individuals unlikely to find alternative employment. 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.

Additionally, some countries in the G20 could be missing out on FDI as a result of concerns over IPR enforcement. This in turn would lead to lower output and employment creation and lower tax revenues for government. Using the findings for Mexico, this could be costing the G20 economies an additional €500 million in lost taxes.

The links between counterfeiting and other criminal activities may also be leading to substantial costs for the G20 governments and their citizens. For the G20 as a whole, the economic and social costs of crime increase by over €20 billion for every 1% increase in the crime rate caused by counterfeiting.

Finally, counterfeit products are unregulated and unsafe. Every year thousands of consumers living and working in countries throughout the G20 suffer accidents and injuries as a result of unregulated counterfeit products. Many, if not most, of these products have been purchased unwittingly by consumers. Unfortunately, 3,000 consumers lose their lives every year as a result of their exposure to dangerous counterfeit products (primarily through counterfeit food and medicines). On conservative assumptions, the economic cost of lives lost to counterfeiting can add up to €14.5 billion each year across the G20 economies.

Accidents and ill-health relating to counterfeiting also put a strain on health services across the G20. While there are few good sources of information on the total incidence of accidents and ill-health caused by counterfeiting, even the most modest assumptions suggests that across the G20 the costs to the health services are likely to exceed €100 million.

For the G20 as a whole therefore our analysis suggests that counterfeiting costs governments and consumers:

- approximately €62 billion annually in lost tax revenues and higher welfare spending;
- approximately 2.5 million jobs are destroyed across the G20 countries and potentially as many as 160,000 individuals unable to find re-employment;
- €20 billion for every 1 % increase in the crime rate caused by the trade in counterfeit and pirated goods; and
- €14.5 billion each year as a result of the 3,000 deaths linked to counterfeit products, not including a cost for additional health services caused by dangerous fake products of more than €100 million each year.

## 5.4 Sensitivities

The methodology used to calculate the figures we have presented is evidence based as far as possible. We have made use of publically available data from reputable sources such as the OECD. 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. A counterfeit rate of 1% will not translate directly into a reduction of industry output by 1%.

For starters, individuals need to be divided amongst those that knowingly purchase a counterfeit product and those that unknowingly purchase one. The probability that an individual would have purchased the genuine product is likely to vary significantly between these two groups. Only purchases made by individuals that would have purchased the genuine article, count as losses to industry turnover.

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.



## 6 Recommendations

Over the course of this project we have built upon previous work to develop a methodology for estimating the impact of counterfeiting on government and consumers. We have also implemented that methodology for four sectors in the UK and Mexico, and have extrapolated some very preliminary findings for the G20 economy as a whole. In implementing the methodology we hope both to have:

- demonstrated the usefulness of this approach to developing our understanding of the effects of counterfeiting; and
- highlighted the extensive negative effects counterfeiting can have on government and consumers.

We have identified a number of key lessons and policy implications over the course of the study. Below we set these out in the form of recommendations. These recommendations relate both to further data collection and analytical work that is required to improve the accuracy of estimates of harm caused by counterfeiting and some policy implications that emerge from the findings for the UK and Mexico.

### 6.1 Recommendations for improving the evidence base

#### 1. Improve the quality and scope of data relating to counterfeiting.

- **Data on consumer responses to counterfeiting:** We need greater information on the level of consumption of counterfeit products, the extent to which customers are knowingly purchasing counterfeit products, the drivers of purchasing such products and the degree to which consumers are substituting away from genuine products.
- **Health and safety effects of counterfeiting:** Governments collected only limited data on deaths associated with counterfeiting and almost no data on accidents and injuries associated with counterfeit products. Given the unsafe and unregulated nature of these products it is vital that better information is collected so that the public can be warned of the dangers, and also so that policy makers can have greater visibility of the costs counterfeiting is imposing.
- **The links between counterfeiting and other forms of crime:** Our study has demonstrated that even small increases in the crime rate can impose very high costs for society. Again, it is important

that the relationship between counterfeiting and other forms of crime becomes better understood.

- **IPR protection and FDI:** Research into this area has demonstrated that developing countries may be losing out on substantial FDI as a result of a reputation for poor IPR enforcement. However, further work is required to fully flesh out and analyse the links between IPR enforcement and FDI in developing countries.

## **2. Work with policy makers and stakeholders to refine the methodology set out in this study.**

This study was completed in a relatively short space of time. We believe it provides a helpful starting place for measuring the effects on governments and consumers of counterfeiting. However, we would hope that over time feedback from policymakers and other stakeholders will help to refine and improve the methodology.

## **3. Implement the methodology in other sectors and countries.**

So far, this approach has been implemented for four sectors in the UK and Mexico. Results for the UK and Mexico economy as a whole and for the G20 have been extrapolated from these findings. In order to improve the robustness and accuracy of the findings, it will be necessary to implement this methodology for a wider set of sectors and countries.

## **4. Carry out a cost-benefit analysis of regulatory responses to counterfeiting.**

This study has identified substantial negative effects of counterfeiting for both consumers and government. It has not, and was not intended to, carry out a cost-benefit analysis of regulatory options for reducing counterfeiting. We suggest that this would be a valuable next step in the analysis

## **6.2 Policy recommendations**

As discussed above the focus of our work has been on quantifying the negative impacts of counterfeiting rather than analysing the potential cost effectiveness of regulatory responses. However, a number of implications can be drawn from our work in terms of potential policy responses:

### **5. Stepping up enforcement is likely to pay for itself.**

While a full cost-benefit analysis of regulatory actions to reduce counterfeiting would be required, the evidence in this report strongly suggests that such actions would be net beneficial. In the UK, for example, losses to government are more than double total expenditure on Customs activity. This doesn't account for the additional costs to society

of higher crimes and deaths, accidents and ill-health. This suggests that greater enforcement activities that lead to even small reductions in levels of counterfeiting are likely to be net beneficial.

**6. The penalties associated with counterfeiting should be reviewed.**

The potential cost of crime associated with counterfeiting could be between 5 and 10% of total expenditure on the criminal justice system. This suggests that stepping up the penalties associated with counterfeiting and the Courts' ability to deal effectively with IPR infringement cases could be net beneficial. We suggest that policy makers should consider whether Courts are adequately equipped to deal with these types of cases and whether the penalties associated with counterfeiting and IPR infringements are proportionate to the harm they cause.

**7. Policymakers should consider the potential benefits of improving IPR enforcement in developing economies.**

It has often been suggested that IPR enforcement retards progress in developing countries, and that such countries simply cannot afford to crack down on IPR enforcement. However, the analysis we have reviewed suggests that this may not be the case, and that developing economies may be missing out on vital FDI and technology transfer because of their limited approach to IPR enforcement.



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