Table of Contents

List of figures

List of tables

List of abbreviations

BASCAP   Business Action to Stop Counterfeiting and Piracy

DSCS   Drug Supply Company Suriname

FMM   Foundation Medical Mission Primary Health Care Suriname

GBS   General Bureau of Statistics of Suriname

HERA   Health Research for Action

MOH   Ministry of Health

MSAH   Ministry of Social Affairs and Housing

NMP   National Medicines Policy

OECD   Organization for Economic Co-operation and Development

RVS   Rokeach Value Survey

SFFC	Spurious/ falsely- labelled/ falsified/ counterfeit
SHI	State Health Insurance Fund
WTO	World Trade Organization

Chapter 1

Introduction

1.1   Definitions

The phenomenon of counterfeiting and piracy gains increasing attention worldwide. According to the Organisation for Economic Co-operation and Development (OECD, 2007-b) it holds that if the potential benefits to produce and distribute counterfeit or pirated goods exceed the potential risks of detection and the potential penalties, then counterfeiters and/or pirates will produce and distribute these illicit goods. They further indicate that that those people and organisations who produce and distribute counterfeit and pirated goods are interested in the types of goods which produce high profit margins (in profitable markets), with low or at least acceptable risks.

      Counterfeiting and piracy are terms which are used to describe a range of illicit activities that are associated

with intellectual property rights (IPR) infringement (OECD 2007-b) Fake, counterfeit, imitation, illicit or pirated goods are goods that result from the phenomenon whereby original goods are copied without the authorisation of the owner of the intellectual property, that is, copyrights and related rights, trademarks, geographical indications, patents, lay-out designs of integrated circuits, undisclosed information (WTO 2012), and where these goods are packaged identically to the originals, as a means to obtain financial benefit (OECD 2007- a).

Previous research has shed much light on the factors which are correlated with the purchase and sale of counterfeit goods. Although several products were considered in these investigations, especially concerning factors that cause the purchase of counterfeit goods, similar factors associated with the purchase of counterfeit medicines (labelled as SFFC) have not yet been extensively studied. Given that SFFC medicines come in many variations (Kelesidis, et al. 2007), and considering the nature of medicines, and therefore the direct and potentially large risks that SFFC versions of a medicine may impose to public health, the World Health Organisation (WHO) provides a special definition for counterfeit medicines.

WHO (n.d.-a) defines a spurious or falsely-labelled or falsified or counterfeit medicine (thus summarized as SFFC) to be 'a medicine, which is deliberately and fraudulently mislabelled with respect to identity and/or source. Counterfeiting can apply to both branded and generic products and counterfeit products may include products with the correct ingredients or with the wrong ingredients, without active ingredients, with insufficient active ingredients or with fake packaging'.

This special definition was formulated by WHO (n.d.-b), as a result of their findings that there were various definitions used for counterfeit medications. Thus, WHO (n.d.-b) recognised the need for a universal definition, as the absence of a universal definition was found to make information exchanges between countries very difficult. In addition, WHO found that the absence of a universal definition limits the ability to understand the true extent of the problem at the global level and this hinders the development of global strategies to combat the problem of SFFC medicines.

1.2   Size of the problem

OECD (2007-b) found Asia to be the single largest-producing region of counterfeit and pirated goods in the world. According to their estimates of the share of counterfeits of the total world trade, the percentage of counterfeits has increased from 1.85% in 2000 to 1.95% in 2007 (excluding: domestically produced and consumed products, or non-tangible pirated digital products) (OECD 2009). Even though this growth is rather small, we believe that the effect of this growth is most likely larger in countries with least developed or developing economies.

An analysis carried out by the OECD (2009) showed that the international trade in counterfeited and pirated products grew steadily from 2000 to 2007. In addition, it was documented that the trade in counterfeit and pirated goods was estimated to account for up to USD 250 billion of total international trade in 2007, which amounts to an increase of about USD 50 billion compared to 2005. More recent estimates concerning the economic impact of counterfeit and pirated goods were done by the Business Action to Stop Counterfeiting and Piracy (BASCAP, 2011) -an initiative by the International Chamber of Commerce (ICC). Based on an OECD report for 2008, BASCAP (2011)

estimated that the international and domestic trade in counterfeits and pirated goods, including digital piracy for 2008 (limited to the G20 economies), ranged between USD 455 billion and USD 650 billion of the total international trade. This estimated amount is expected to range between USD 1220 billion and USD 1770 billion by 2015.

Concerning the size of the SFFC medicines, various sources report that it is estimated that at least 10% of the pharmaceutical trade worldwide consists of SFFC medicines. In May 2012 the World Health Organization (WHO, 2012) reported that less than 1% of market value in the industrialized countries with effective regulatory systems and market control (that is, Australia, Canada, Japan, New Zealand, the United States of America, and most of the European Union) (according to the estimates of the countries concerned) could be deemed as SFFC medicines. In addition, WHO (2012) suggested that in many African countries, and in parts of Asia, Latin America, and countries in transition, a much higher percentage of the sold medicines are SFFC medicines, as the regulatory and enforcement systems for medicines are weakest in most of these countries with developing or least developed economies. According to the estimates of the International Medical Products Anti-Counterfeiting Taskforce (IMPACT),

a partnership comprising all the major anti-counterfeiting players including international organisations, non-governmental organisations, enforcement agencies, pharmaceutical manufacturers associations and drug and regulatory authorities (IMPACT n.d.-b), the share of SFFC medicines in many countries in Africa and parts of Asia and Latin America is believed to be more than 30% of the medicines on sale (IMPACT 2008).

IMPACT (2008) also reported that in many of the countries of the former Soviet Union the proportion of SFFC medicines is estimated to be above 20% of market value, while for medicines purchased via the internet from illegal sites that conceal their physical address the estimate is that in over 50% of cases these medicines are SFFCs.

1.3   Effects of counterfeiting and piracy

Research by the OECD (2007-b) on the economic impact of counterfeiting and piracy has emphasised that virtually every economy has to deal with counterfeit and or pirated products, either concerning the production or the distribution of these goods. The OECD also reported the impact of the production and distribution of counterfeit and

pirated goods to be larger in countries with developing economies than in those with developed economies. They found this to be partially due to the relatively weak regulatory and enforcement systems in most of the developing countries. Some of the main (negative) effects of counterfeiting and piracy on national economies that governments have to deal with, according to the OECD (2007-b) are the increase of criminal activities, including tax evasion, the loss of foreign direct investments (FDI), and the employment, environmental, innovation and economic growth issues.

As the major negative economic impacts of counterfeiting and piracy activities are not merely restricted to international trade and national economies in general (OECD 2007-b), BACAP (2011) estimated that for 2008 the employment losses (limited to the G20 economies) amounted to 2.5 million individuals. For the year 2015 BASCAP predicts a number of more than 2.5 million of employment losses. With regard to the broader economy-wide effects in 2008, that is, effects on government tax revenues, welfare spending, costs of crime health services, and FDI flows, BACAP (2011) estimated (limited to the G20 economies) that the losses amounted to USD 125

billion. For 2015 they predicted that the broader economy-wide effects will amount to more than USD 125 billion.

Other identified victims of the illegal activities of counterfeiters and pirates are the right holders of the intellectual property (mostly companies) and the consumers of counterfeit and pirated goods (OECD 2007-b). With regard to the consumers, both the deceived (unknowing and thus unwilling) consumers of counterfeit and pirated goods (called the primary market, Scorpecci 2009), as well as the non-deceived (knowing and thus willing, the secondary market) are found to suffer negative effects, varying from lower consumer utility of a good to imposed health and safety risks. Especially in case of SFFC medicines, the consumption of these illicit medicines has sometimes even resulted in death (Dixon & Greenhalgh 2002).

1.4   General motivation

In order to understand, measure, reduce and/or eliminate the impact of counterfeit and pirated goods as much as possible, previous research has approached this phenomenon from both the supply side, which is the side of the producers and

distributors, as well as the demand side, which is the side of the consumers of the illicit goods.

Given that almost every type of good has been counterfeited and/or pirated over the years, and that these numbers are believed to only be increasing (OECD 2007-b; Dixon & Greenhalgh 2002), and considering the negative effects of counterfeiting and piracy (hereinafter all referred to as counterfeiting), this study on counterfeit goods was done as a means to contribute to the battle against these illicit goods. The following empirical evidence can enhance and refine the existing knowledge and understanding, and hence increase the possibilities to battle against the purchase and use of counterfeit products, especially counterfeit medicines. Indeed, empirical information is very essential in order to effectively reduce or eliminate the negative impacts and to decrease the scale of counterfeiting, both at the national as well as international level, and for the primary market as well as the secondary market.

This study mainly considers the phenomenon of counterfeits for the South-American country Suriname, and its angle is the demand side Suriname is selected as this country has a developing economy, and because of the limited availability of information for such developing countries, although there are various possibilities for data

collection (see below). Investigating counterfeits in Suriname is also interesting as consumer-specific data from this country can be used to compare against such data for the Netherlands, a country with a developed economy (but with a large population of Surinamese individuals). This consideration is also based on the long relationship between Suriname and the Netherlands, which dates back to shortly before the year 1667. And, 30% - 40% of all Surinamese individuals live in the Netherlands. In addition, as most of the Dutch people of Surinamese origin still retain a relationship with the country of origin (and their family members) even though they are generally well integrated in the Dutch society, this creates the opportunity to compare data from these two countries for our research purpose.

1.5   Outline of this dissertation

In the second chapter of this dissertation we use the Norton and Bass (1987) model to study the diffusion processes of original and counterfeit products and their interaction, in three distinct product categories. Viewing original and counterfeit products as two generations of products, we respectively label them generation one and generation two.

Simply formulated, the Norton and Bass (1987) model states that from the time of launch of the second generation (at a certain point in time), a portion of the sales that could have gone to generation one, go to generation two. Based on this model we formulated three hypotheses on the properties of the diffusion processes of these two generations (in three distinct categories) for Suriname. Based on annual data on original and counterfeit shipments (in kilograms) we support various predictions from theory and we address when the diffusion processes peak, how sales of original and counterfeit products are related and how marketing efforts can influence this process.

In chapter 3 we address the diffusion patterns of pharmaceutical and medical products, using detailed (actual) shipping figures of Suriname's main harbour in Paramaribo, concerning the total shipments (in kilograms) of original and counterfeit medical products across five product categories for 1996-2008. As data on the exact amount of counterfeit drugs were not available, we provide a method to estimate the portion of counterfeit drugs within a single developing country. Using various time series techniques we study how sales of original and counterfeit medical products are related, and the link between the diffusion processes for original and counterfeit products. We also

discuss several policy implications as a means to battle counterfeit pharmaceuticals in Suriname. Note that our interest is in the portion of counterfeits in the total amount of pharmaceutical products, and therefore not in the actual figures.

In chapter 4 we propose that cultural norms and values are an important driver of individual purchases of counterfeit products. As norms and values have been found to be relevant in other situations concerning illegal activities (Fisman and Miguel 2007), and given that most of the studies concerning the individual purchases of counterfeit products are only based on interviews for one particular group of individuals and never include control groups, we aim to add to the literature on cultural norms and values to literature, by collecting detailed survey data on three groups of individuals which in various dimensions should be similar while in others are very dissimilar. In short, we interview Surinamese individuals in Suriname, Surinamese individuals in the Netherlands (an OECD country) and Dutch individuals in the Netherlands. Our main focus is on the similarities and differences across these three groups, where the first two would be more similar in terms of cultural norms and values, whereas the last two groups would be more similar in terms of income. We present

evidence that cultural norms are indeed a key driver for purchases of counterfeit products. We also discuss some implications for policy.

In chapter 5 we study how several factors associate with consumers' (conscious) purchases of counterfeit medicines, as this has not yet been extensively studied. We examine how aware Surinamese individuals were when purchasing medication in the past; how their current attention for SFFC medicines is when they purchase (obtain) their medication, as well as their attitudes towards SFFC medication. If one would want to change their behaviour, then it is of course important to have insights into consumer perceptions, attitude, alertness and awareness. We assess whether and to what extent consumers are suspicious of having received SFFC medicines (on doctor's prescription) through the official distribution channel (that is: pharmacies), and how health risks, confidence in the official channel and several factors with regard to product information correlate with consumer suspicion, alertness when obtaining medicines through the official channel and their use of SFFC medication. In addition we address how these aforementioned factors, among other factors, associate with consumers their (conscious) past purchases of SFFC medication.

Chapter 6 is directed towards testing two types of health messages, which could be used in awareness campaigns against the use of counterfeit (labelled as SFFC) medicines. As developing countries do not seem to have a large number of instruments if they want to reduce the use of SFFC medical drugs, active awareness campaigns are believed to be potential instruments for these sorts of governments of developing countries like Suriname, where the use of SFFC medical drugs is estimated to be substantial (see Chapter 3 also). Given that there is much evidence that threatening health messages are often not effective, we propose two different claims- one claim containing a threatening message, while the second alluded to national pride- which could be used in awareness campaigns in Suriname. We find that the response to the claims does not differ across people who use or do not use SFFC medication. At the same time, the threatening message appears most effective and it was also best understood.

In chapter 7, this dissertation is concluded with a brief overview of the findings. Some implications of our research are presented, and various topics for further research are outlined.

Chapter 2

Diffusion of original and counterfeit products in a developing country

Abstract

We study the diffusion of original and counterfeit products in three distinct categories in a developing country. The focus is on when their diffusion processes peak, how sales of original and counterfeit products are related and how marketing efforts can influence this process. Using a unique data set for Suriname (South America) on televisions, mobile phones and DVDs, we can support various predictions from theory and give recommendations for marketing management.

2.1   Introduction

With an increase in global trade, currently involving almost all countries in the world (expect for a few autarkic ones), there is also a growing interest in studying various aspects of trade in counterfeit products. A recent survey by Staake et al. (2009) shows that counterfeit trade is sizeable, that it concerns all countries and that it is growing over time. One aspect that seems to have reached much attention recently concerns the motivations for consumers to purchase counterfeit products, in particular when they are aware that the products are indeed counterfeits, see Bian and Moutinho (2009), Tom et al. (1998) and Wilcox, Kim and Sen (2009). Interestingly, these studies all concern consumers in western countries (most notably the USA), and as such these studies address only one part of the story. Also, these studies often concern survey data and not factual purchases of counterfeit products.

Whereas consumers in western countries oftentimes can choose to purchase original or counterfeit products, in many developing countries consumers do not have much of a choice. Due to lack of budget, many consumers in those countries are forced to purchase counterfeit products even though they know that these products can be of lower

quality (like televisions of DVDs) or even of harmful quality (pharmaceutical products). Hence, there is much literature on consumers buying counterfeit products, on the production of counterfeit products in certain countries and on the legal issues around counterfeiting. This literature seems to be confined uniquely to western countries and does not concern developing countries. A key reason for this might be that data for developing countries are not available and also that relevant legal measures may be absent in those countries.

In this paper we provide a first attempt to fill in this gap, and we study the diffusion of products in three categories for a developing country, in our case the South American country of Suriname. This country is a little over 163K squared kilometres and it has less than 500K inhabitants. Most of the country is heavily forested, and most citizens live in the coastal region, predominantly in Paramaribo, the country its capital city. Paramaribo has a large harbour, and most import and export goes via this harbour. Despite an abundance of natural resources, income inequality in Suriname is very large. It is estimated that over 60% of its inhabitants are below the poverty line. On the other hand, there is a sizeable group of citizens that is rather wealthy. This means that there should be citizens who can

afford to purchase original products if there are any, and also that there are many citizens who can only afford counterfeit products (as their prices are typically much lower).

In this paper we will collect and analyse annual (shipment) imports data for products in three categories. These imports data are then classified as original or counterfeit products, according to a rule that gives the percentage of counterfeit products from various countries. Details will be given in the empirical section.

To guide our empirical analysis, we first put forward a few theoretical considerations on how the diffusion of original and counterfeit products may look like in a developing country, where financial resources of many consumers are scarce. The theory builds on the Norton and Bass (1987) model for the diffusion of sequences of products. We derive a few testable hypotheses from the theoretical considerations. An alternative approach that also builds on diffusion models is presented in Givon et al. (1995). These authors assume a Bass type diffusion model for the total diffusion of durable products and as such they estimate the size and diffusion pattern of counterfeit products. Our approach differs to the extent that we first

estimate the diffusion of original and counterfeit products and then analyse the two resulting series.

In the empirical section we examine the validity of the proposed hypotheses for a unique data set concerning Suriname. This dataset concerns estimates of sales of televisions, mobile phones and DVDs, based on raw (shipment) import figures obtained from the General Bureau of Statistics of Suriname. Note that these types of data are generally not easy to obtain. Using a publicly available software piracy index, we create estimates of the total sales of original products and of counterfeit products.

Our main conclusions, which summarize those for each of the three categories, are that the diffusion pattern of original and counterfeit products is about the same, with the key difference that counterfeits are launched later and thereby also peak later. Hence, it is not the case that counterfeit products eventually take over and fully wipe out original products. A next striking result is that total sales of originals and of counterfeits are about equal. Hence, it is again not the case that first a few originals are launched, and then counterfeits take over fully thereby shrinking originals sales towards zero.

Although our findings hold for only three categories for a single developing country, we believe that we can

present a few implications for marketing management concerning optimizing sales level of original products in developing countries, and we do so in the last section of this paper.

2.2   Theory

In this section we derive a few testable hypotheses on how diffusion of original and counterfeit products could look like in a developing country. The basis for these hypotheses is the Norton and Bass (1987) model for generations of products, and in our case, a category of products. It is not the case that this model must also be fitted to actual data, but the theoretical model is used to shape our thoughts and to put forward some hypotheses.

2.2.1   Descriptions of diffusion

We start with a familiar S-shaped pattern for the diffusion of new durable products. The basic Bass (1969) model characterizes this S shape by the following functional form, that is:

$$F(t) = \frac{1 - \exp(-(p+q)t)}{1 + \frac{q}{p}\exp(-(p+q)t)}$$

(1)

where $t = 0, 1, 2, ..., T$ with T the total amount of available observations, p is the so-called innovation parameter and q is the so-called imitation parameter. An example graph of the functional expression in (1) is given in Figure 2-1. The S-shape corresponds with total (cumulative) sales, and the graph of the sales defined by $F(t) - F(t-1)$ is given in Figure 2-2.
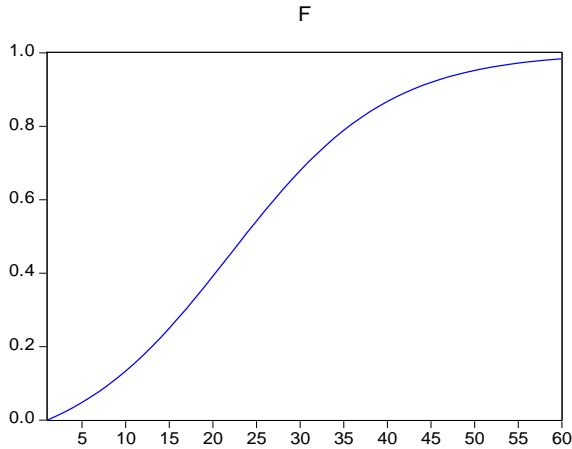
Figure 2- 1: The function in (1) with $p = 0.01$ and $q = 0.1$
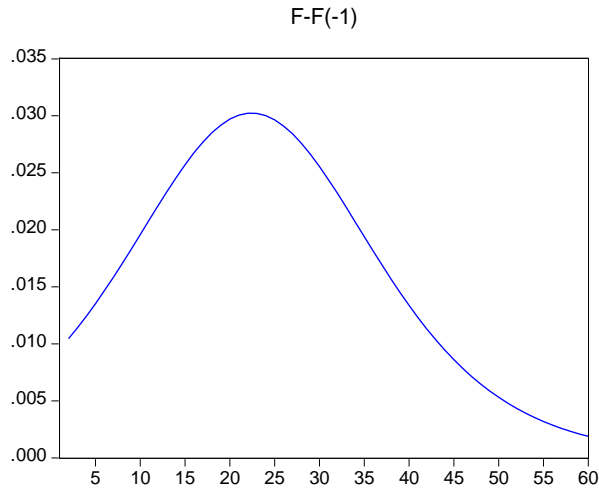
Figure 2- 2: Sales corresponding to the function in (1).

The graph in Figure 2-1 shows that cumulative sales (diffusion) level off to 1 here, which would mean that in the end market potential has been reached (or: everybody has purchased the products in a category). Market potential is usually labelled as *m*, the size of the total diffusion at maturity level (like the total number of purchases of a mobile phone). The graph in Figure 2-2 shows that sales follow a hump-shaped pattern and that there is a moment of peak sales. The timing of the peak depends on the parameters p and q.

In fact, for the Bass model it can be computed as:

$$T_{peak} = \frac{1}{p+q} \log \frac{q}{p}$$

(2)

This Bass model is frequently used in marketing to describe the diffusion of a single durable product. In case there is not a single product but a sequence of versions of the same product (think of new models of cars, new versions of a textbook, and cameras with newer technology) then one can use the Norton and Bass (1987) model.

Later on, we will view originals and counterfeits also as two generations of products.

If we call the first generation 1 and the second generation 2, then the two equations of the Norton and Bass model are:

$$S_1(t) = m_1 F_1(t)[1 - F_2(t - \tau)]$$

(3)

and

$$S_2(t) = F_2(t - \tau)[m_2 + m_1 F_1(t)]$$

(4)

where:

$S_i(t)$ is the sales of the products of generation $i = 1, 2$

m_i is the maturity level of generation i

$F_i(t)$ is the S-shaped function like (1) for generation I
(with parameters p_i and q_i)

τ is the launch date of the second generation.

Figure 2-3 gives example graphs of the S-shaped functions for two successive generations, where τ is set at 30. Figure 2-4 gives the according sales graphs, where the data are created using (3) and (4).
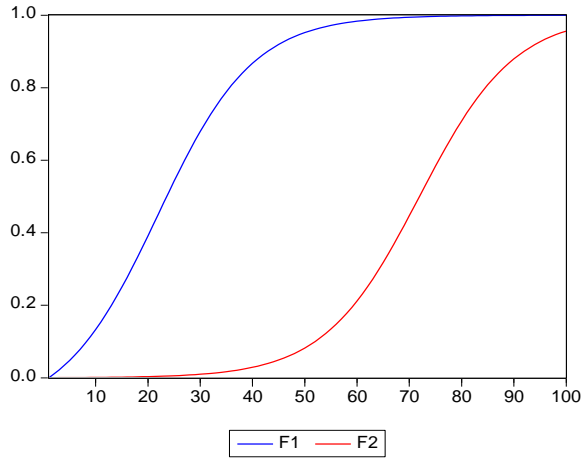
Figure 2- 3: Two functions like in (1) with $p = 0.01$ **and**

$$q = 0.1$$
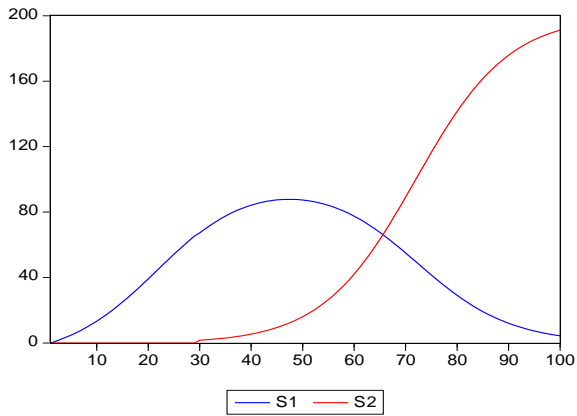
Figure 2- 4: Sales of generations 1 and 2 where

$$m_1 = m_2 = 100$$

In words, the Norton and Bass model says that from the time of launch of the second generation (at time τ), that then part of the sales that could have gone to generation 1 goes to generation 2. That is, so-called late(r) adopters of products in a category of generation 1 switch to generation 2 when this new generation comes to the market. By varying the parameters p_i, q_i and m_i, one can create a wide variety of patterns. In terms of original and counterfeit products, later adopters would then likely switch to the counterfeits.

In this paper we use the Norton and Bass (1987) model to hypothesize on the diffusion of original products and of counterfeit products, and their possible interaction. Indeed, we adopt the notion that generation 1 concerns the original products, while generation 2 concerns the counterfeits. We will formulate hypotheses on the properties of their diffusion processes based on this model. As these properties are defined by the parameters p_i, q_i, m_i, and τ, we arrange these hypotheses according to these parameters.

2.2.2 Originals and counterfeits as two generations

We start with looking at the launch date of the counterfeits. When the Norton and Bass (1987) model is used to describe successive generations of durable products, for example where each time the technology gets improved, it has been derived (Wilson and Norton, 1990) that the best strategy for a firm is either to launch generation 2 at the same time as generation 1 or to launch generation 2 when generation 1 is sold out. This result is strongly based on the assumption that the producer is a monopolist who is the only firm making and selling that product.

In terms of original and counterfeit products, things may be different. First of all, it is unlikely that counterfeit products are developed right at the very same moment as that original products are made. It is quite likely that there is a time delay, also because the counterfeiters need time to make their counterfeit products. Second, it seems pointless to sell counterfeit products in case people would not be interested in purchasing the related original products in the first place. Hence, consumers should first be aware of the original products, and these must be available, before an

interest is aroused for counterfeit products. This leads us to propose:

Hypothesis 1: Counterfeits enter the market later than originals do.

The next issue concerns the sales of the original products when counterfeits come to the market. It might be conceivable that the sales of originals immediately drop and that only counterfeits will be purchased. A visual impression of such a situation is given in Figure 2-5. In practice this may perhaps be unlikely, as (1) counterfeits may differ in quality from the originals and (2) there will also be people who can afford to buy the originals. Hence, to us, a picture like Figure 2-5 seems unlikely. What is perhaps more likely is that generation 2 (the counterfeits) take over faster, that is, the imitation coefficient q of the counterfeit diffusion is larger than that of the originals' diffusion. One then would get a picture like Figure 2-6.
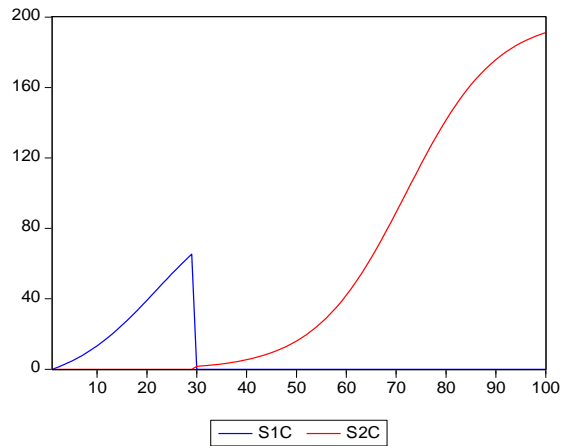
Figure 2- 5: Original sales drop to zero when counterfeits are introduced
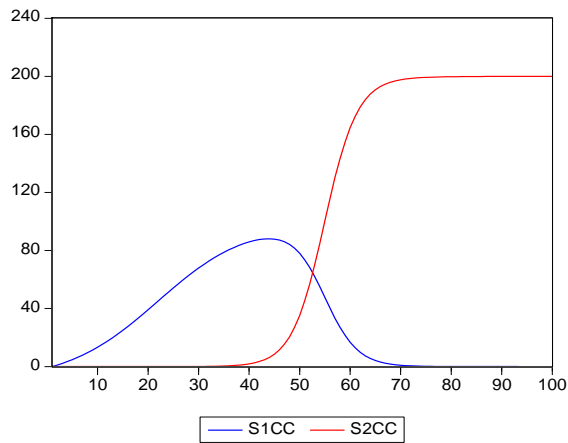
Figure 2- 6: Counterfeits quickly take over the market.

Additionally, it can also occur that the counterfeit products find their way to one type of consumers, while the original products address the other type of consumers. So, at first sight there is no other proposal to do than to assume that the two diffusion patterns are broadly similar, see also Givon et al. (1995). These considerations thus lead us to propose:

Hypothesis 2: The shapes of the diffusion process of originals and counterfeits are broadly similar.

This hypothesis means that the p_i and q_i parameters can of course differ (slightly) across the originals and counterfeits, but in a general sense the pattern of sales and cumulative sales is the same. Combining Hypothesis 2 with Hypothesis 1 suggests that the diffusion of counterfeits must peak later than the diffusion of originals.

Finally, would there be any reason for the maturity levels m_1 and m_2 to differ? This would depend on the timing of the launch of the counterfeits and on the total size of the adopters of each of the types of products. And, the earlier counterfeits are introduced to the market, the larger will be m_2 relative to m_1. When the shapes of the diffusion

patterns are about the same, and counterfeits are introduced a little later than the originals, we would be tempted to propose that counterfeits will have a larger maturity level than that of originals, see also the suggestion in Givon et al. (1995, p.29). So,

Hypothesis 3: In the end, more counterfeit products are sold than original products.

To summarize, we conjecture that:

(1) counterfeits are launched a little later than the originals and thus may peak later,
(2) diffusion patterns of originals and counterfeits are broadly similar, and,
(3) total sales of counterfeits outnumber the sales of originals.

These three conjectures also suggest that there is not much interaction between the diffusion patterns of the original and counterfeit products. Hence, we propose that it is quite likely that deviations from the diffusion paths of originals and counterfeits are not much correlated.

2.3   The data

We have collected data for the South American country of Suriname. It is a small and open economy, with a single large (maritime) harbour in the capital city of Paramaribo. The country has many natural resources. It once was a colony of the Netherlands, and it became independent in 1975. Economic growth slowed down since the beginning of the 1980ies, but since 2000 there is a steady growth in GDP and an increase in welfare. The country is sparsely populated, with most of the citizens living in the coastal area. Although average welfare is on the rise, the income inequalities in Suriname are quite large. The country boasts a non-negligible group of multi-millionaires, but on the other hand it is estimated that more than 60% of the population is below international poverty levels.

Sales records for products like televisions, DVDs and mobile phones, which are the categories of interest, do not exist. Hence, we have to estimate the diffusion patterns of these products using alternative methods. We consulted the General Bureau of Statistics of Suriname and we were able to collect annual data on the imports of products shipped to Suriname, in these three categories for the period 1996 to and including 2008. These imports are measured in

kilograms and in total value (in US dollars). We decided to take the weights in kilograms as the measurement unit. Additionally, and this is crucial for our purposes, we have information on the countries of origin of the shipments.

To assign products to the classes of original products and counterfeit products, we use the software piracy index, which can be obtained from www.nationmaster.com. This website presents a list of countries and gives an estimate of the fraction of products (here: computer software) that are most likely to be counterfeit. In the Data Appendix we provide a list of relevant countries for our product categories and the corresponding percentages. Like this list, we shall take it as likely that 23% of the DVDs, mobile phones and television sets that are imported from Japan amount to counterfeit products, and that it is as much as 82% of these products originating from China that are counterfeits. Of course, we shall never be certain whether these percentages also hold for our product categories, nor if this figure changes over time or amounts to a biased estimate, and hence we warn the reader that the subsequent data should not be considered as exact amounts but merely as estimates. For our purposes, however, the absolute numbers do not matter, but their time series properties do. We shall see below that the estimates

are instrumental for finding support (or not) for the hypotheses in the previous section. In order to allow the reader to verify the computations about which we report in the next section, we present our data in the Data Appendix. Graphical details and other aspects of these series will be discussed in the next section.

2.4   The results

In this section we analyse the diffusion patterns for the three categories. We start with mobile phones, then we analyse television sets and we conclude with DVDs. First we focus on the diffusion pattern of the originals and counterfeits separately, and after that we consider potential correlations.

To examine the properties of the diffusion pattern we estimate the parameters in the Bass model when it is written in the format:

$$Y_t = mp + (q - p)CY_{t-1} - \frac{q}{m}CY_{t-1}^2 + \varepsilon_t$$

(5)

Here, Y_t denotes actual sales (shipments) and CY_t denotes cumulative shipments. When it is found that this Bass model does not fit the data well, for example because the estimate for p is not significant (which makes (1) difficult to interpret), then we rely on the logistic function:

$$CY_t = \frac{m}{1 + \exp[-\alpha(t - \beta)]}$$

(6)

Here, t runs from 1 to T. Note that the parameter β now measures the moment of peak sales (shipments), and α implies the shape of the curve.

To examine short-run and contemporaneous correlations, we estimate a vector auto-regression of order 1, given by

$$Originals_t = \mu_1 + \rho_1 Originals_{t-1} + \lambda_1 Counterfeits_{t-1} + \varepsilon_{1,t}$$
$$Counterfeits_t = \mu_2 + \lambda_2 Originals_{t-1} + \rho_2 Counterfeits_{t-1} + \varepsilon_{2,t}$$

(7)

The parameters in this vector auto-regression can be estimated using ordinary least squares when applied to each of the equations. Estimated parameters in such a model are usually difficult to interpret, so in practice one typically relies on the so-called impulse response functions, see Franses (1998) and various other textbooks.

2.4.1   Mobile phones

The first category that we study concerns shipments of telephones. The graphical impression that one gets from Figures 2-7 to 2-9 is that diffusion patterns show similar patterns indeed.
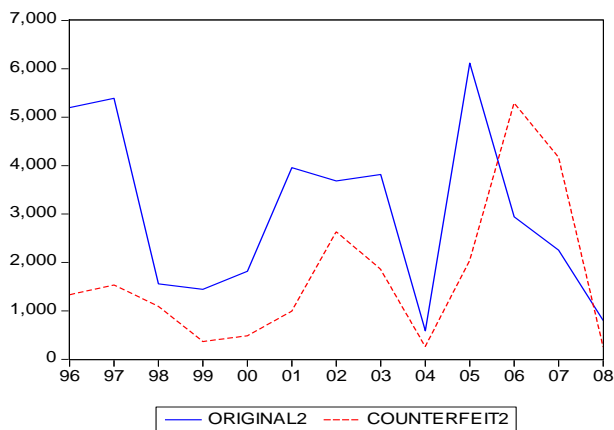
Figure 2- 7: Originals and counterfeits: the case of mobile phones
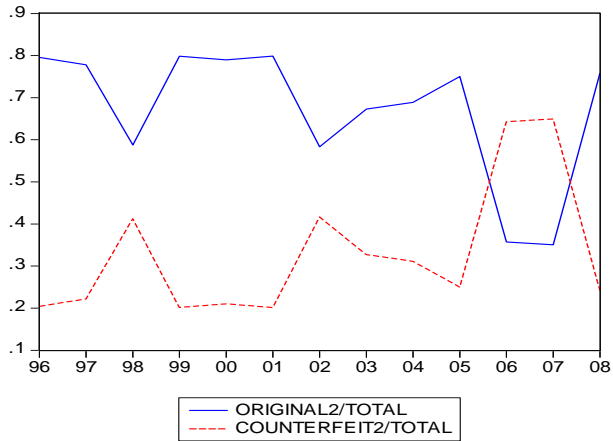
Figure 2- 8: Fraction of total, Originals and counterfeits: the case of mobile phones
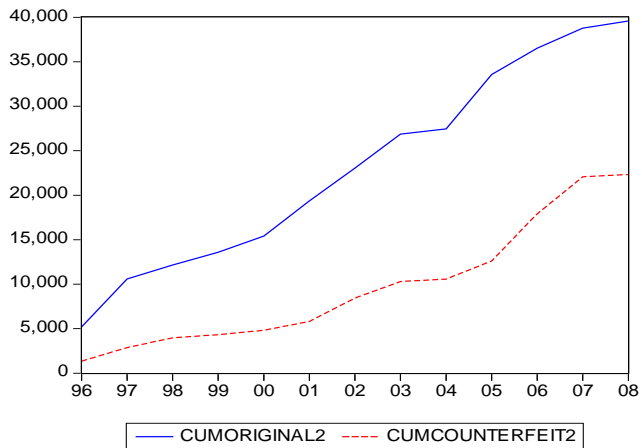
Figure 2- 9: Total diffusion of originals and counterfeits: the case of mobile phones

50

When we fit a Bass model to the data in Figure 2-7 we obtain insignificant estimates of p for both series, so we turn to estimating (6) for the data in Figure 2-9. The results on the diffusion peak appear in Table 2-1.

Table 2- 1: Estimates of the time of the peak of diffusion

Category	ORIGINALS			COUNTERFEITS		
	Parameter (Standard error)		Year	Parameter (Standard error)		Year
Mobile phones*	6.605	(0.717)	2003	13.634	(4.178)	2010
Televisions**	6.842	(NA)	2003	7.720	(NA)	2004
DVDs	8.314	(0.565)	2004	9.113	(0.346)	2005
* Parameter estimates are based on a logistic function						
** Parameter estimates are based on a Bass growth curve						

From the first row of this table we learn that the diffusion peak of originals occurred in 2003, while that of counterfeits is still to come in 2010. The estimated values of α in (6) are 0.272 and 0.250, respectively, and this shows that the diffusion patterns are indeed similar.

Table 2- 2: Estimates of the level of maturity

Category	ORIGINALS		COUNTERFEITS	
	Parameter		Parameter	
	(Standard error)		(Standard error)	
Mobile phones*	49767	(4021)	58477	(34873)
Televisions**	4658066	(1293148)	6144432	$(NA)^+$
DVDs*	1263922	(116217)	818647	(61776)
* Parameter estimates are based on a logistic function ** Parameter estimates are based on a Bass growth curve + This estimate is obtained from first estimating a Bass model for total diffusion (is originals plus counterfeits), and from the estimated maturity level for the total (10802498) we subtract the estimated maturity level for originals (4658066)				

In Table 2-2 we present the estimates of the maturity levels for each of the two types of products. We see that these estimates are very close, with counterfeits their total sales being slightly larger.

Response to Cholesky One S.D. Innovations ± 2 S.E.
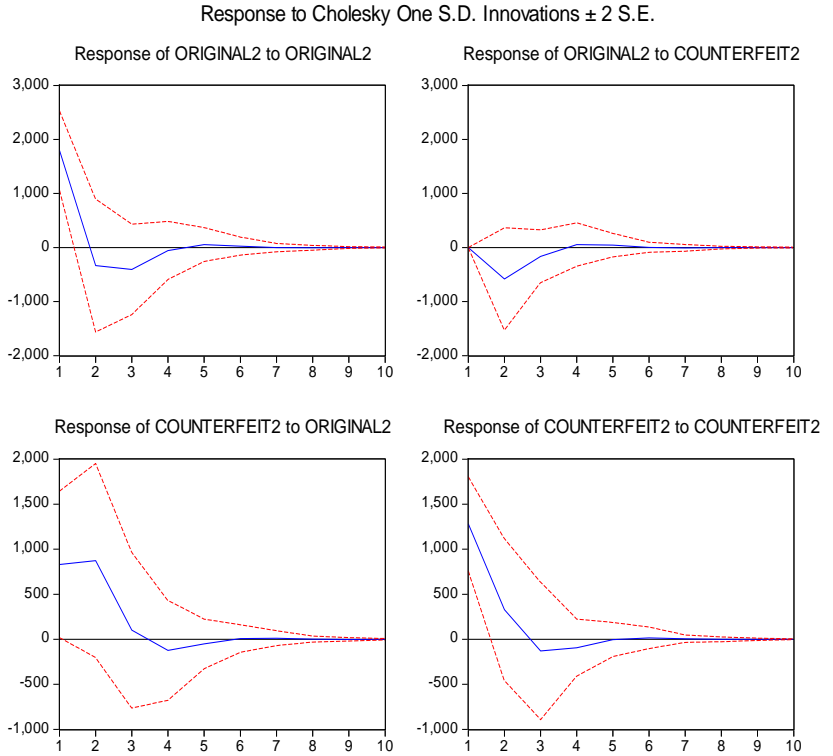
Figure 2- 10: Impulse response functions for a vector auto-regression for the bivariate variable containing Originals and Counterfeits: the Case of Mobile phones

In Figure 2-10 we give the impulse response functions for an estimated vector auto-regression of order 1 as in (7). The key graphs are the off-diagonal ones. The

right-upper graph indicates that original sales do not respond to an impulse from counterfeits. The left-lower graph suggests that counterfeits do respond (significant at 5%) to originals, but only for one period. In sum, correlations between original and counterfeit diffusions are barely relevant.

2.4.2   Televisions

The second category that we study concerns shipments of televisions. The graphical impression to be obtained from Figures 2-11 to 2-13 is that actual diffusion seems rather different, but that total diffusion seems to have about the same trend.
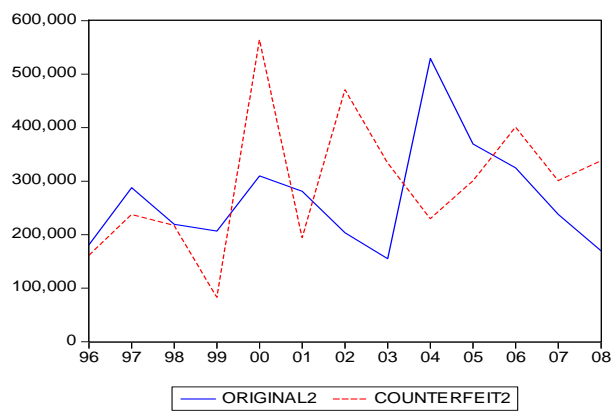
Figure 2- 11: Originals and counterfeits: the case of televisions
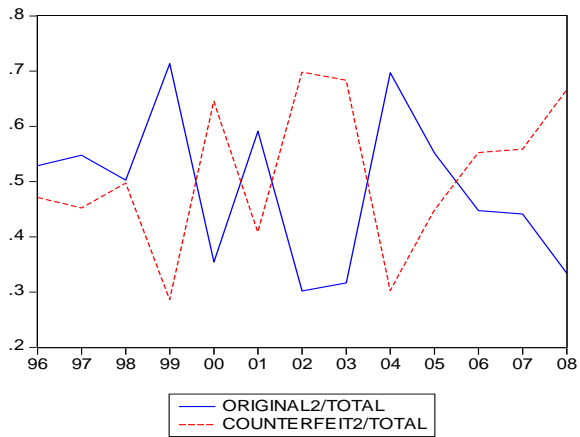
Figure 2- 12: Fraction of total, Originals and counterfeits: the case of televisions
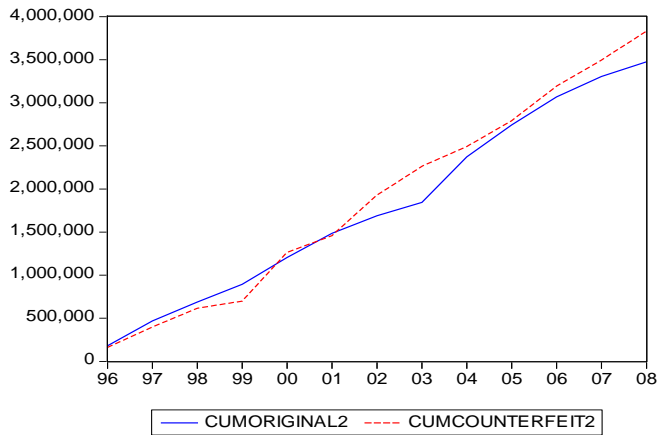
Figure 2- 13: Total diffusion of originals and counterfeits: the case of televisions

Visually it is difficult to spot the moment of peak diffusion, and hence we rely on the Bass model in (5). For originals we find that the peak year is estimated to be 2003, while for counterfeits it is estimated to be 2004.

Table 2-2 shows that the estimated maturity level for counterfeits is slightly larger than that of originals. The estimated p and q parameters for originals are 0.040 and 0.180, and those of counterfeits are 0.036 and 0.139, so again we see a strong similarity across the two diffusion patterns.

Response to Cholesky One S.D. Innovations ± 2 S.E.
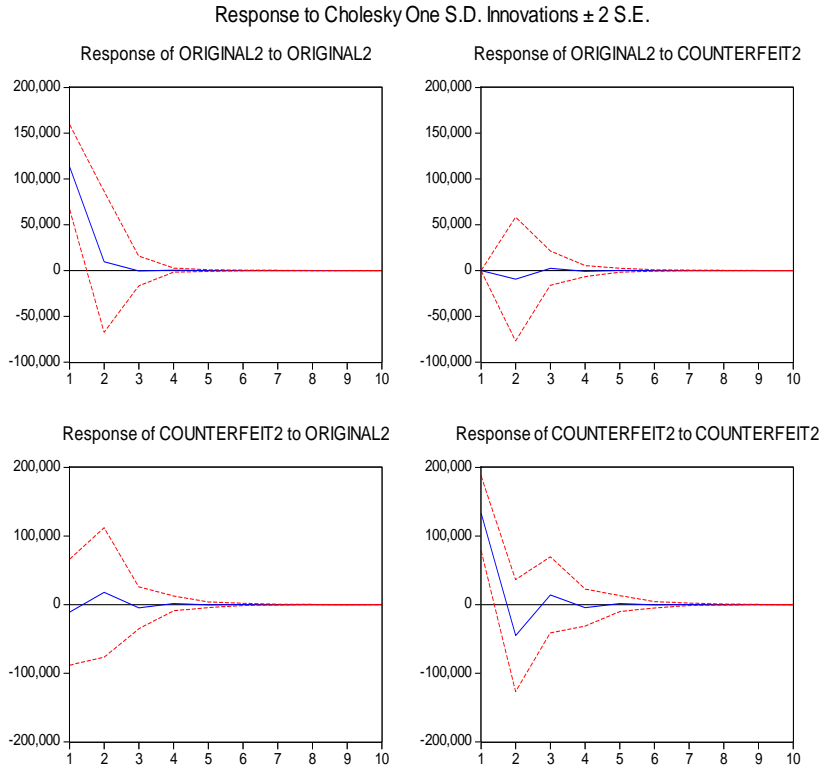
Figure 2- 14: Impulse response functions for a vector auto-regression for the bivariate variable containing Originals and Counterfeits: the Case of Televisions

The impulse response functions in Figure 2-14 clearly show that there is no dynamic correlation between originals and counterfeits.

2.4.3 DVDs

The third and last category that we study concerns shipments of DVDs. The graphical impression to be obtained from Figures 2-15 to 2-17 is that actual diffusion is rather similar and also that total diffusion seems to have about the same trend.
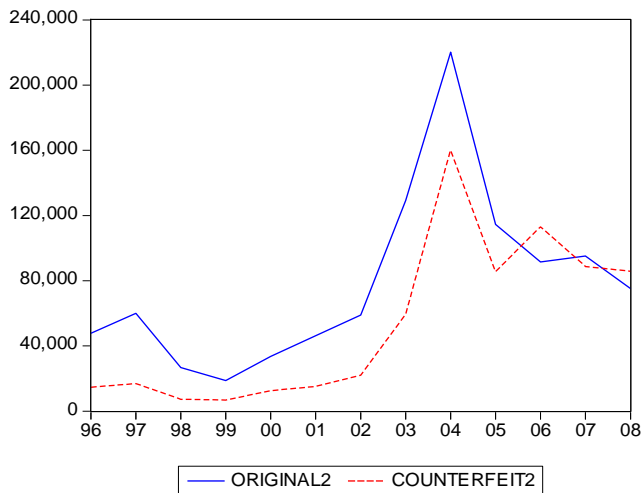
Figure 2- 15: Originals and counterfeits: the case of DVDs
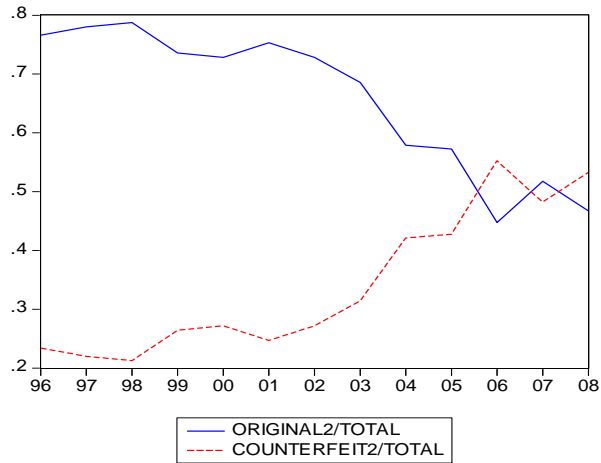
Figure 2- 16: Fraction of total, Originals and counterfeits: the case of DVDs
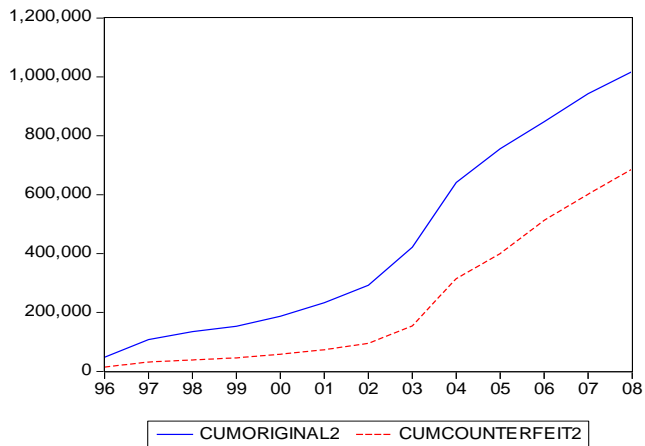
Figure 2- 17: Total diffusion of originals and counterfeits: the case of DVDs

The estimation results in Table 2-2, again for the logistic function in (6) as the Bass model in (5) gives insignificant estimates for p (making estimation of the peak moment impossible), show that originals peak in 2004 while counterfeits peak in 2005.

The estimates for β in (6) are 0.409 and 0.568, respectively, and their estimated standard errors are 0.055 and 0.044, and hence we can conclude that also these parameters are approximately equal.

Response to Cholesky One S.D. Innovations ± 2 S.E.
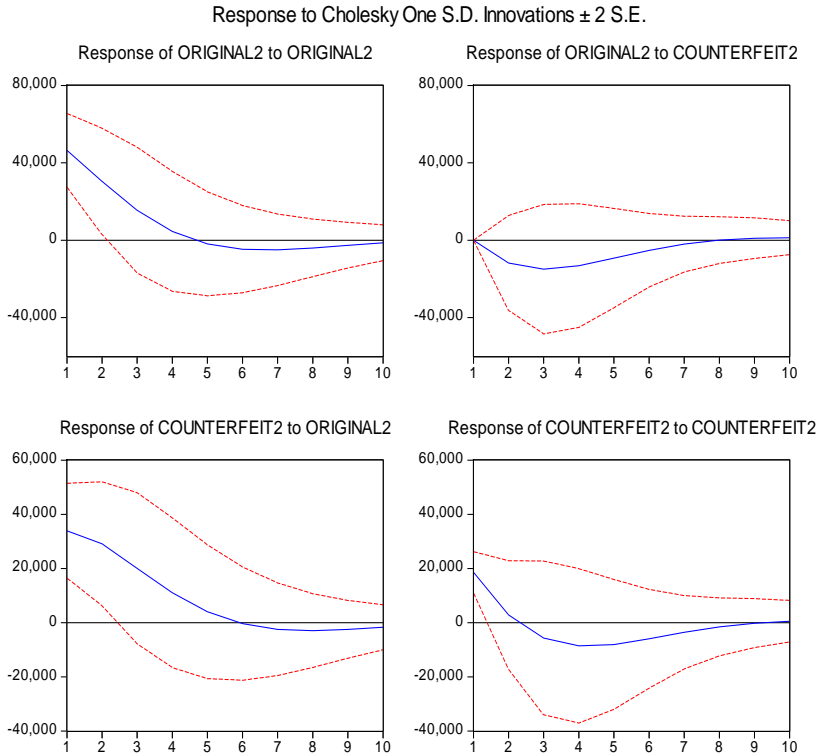
Figure 2- 18: Impulse response functions for a vector auto-regression for the bivariate variable containing Originals and Counterfeits: the Case of DVDs

The impulse response functions in Figure 2-18 clearly show that for DVDs we get a similar pattern as for mobile phones.

Counterfeit diffusion now responds with one lag and with two lags to an impulse in original diffusion (left-bottom panel), but otherwise there is no dynamic correlation between originals and counterfeits.

In sum, our detailed analysis of the diffusion patterns of original and counterfeit products learns that the diffusion patterns are broadly similar but that peak diffusion of counterfeits appears later. This support for Hypothesis 2 implies that counterfeits must enter the market later, and this in turn supports our Hypothesis 1. Next, we saw that for two of the three categories the maturity level for counterfeits is estimated as being higher than for originals. However, the difference between the two estimated maturity levels is not very large (and also not significant if we compare the associated standard errors as they are also reported in Table 2-2). Hence, we are tempted to suggest that eventual maturity levels are about equal, at least in this case of three categories.

2.5   Conclusions

The analysis in this paper concerned three categories for which we have estimated annual data on original and counterfeit shipments (in kilograms) for a single developing country, here: Suriname. Data like this have never been compiled nor analysed, so we believe that our findings are of some value for understanding diffusion of counterfeit products.

Of course, given the limited focus and sample size, we can come up with a long list of limitations to our study, which would address the data, the country, the products, and of course whether our findings lead to any generalizing statements.

On the other hand, when counterfeit diffusion mimics original products' diffusion, while at the same showing limited correlation over time with originals, there are a few lessons that can be learned for marketing management. As we did not see that counterfeits wipe away originals, it thus still seems worthwhile to introduce new original products in a developing country. If new versions of these original products are launched quickly one after another, then counterfeiters may need to make choices about which originals to copy and this may delay market

entry and also may reduce counterfeit versions. To attain high maturity levels, one may want to have the diffusion to peak rapidly, and this can be achieved by marketing campaigns.

Even though the majority of customers is less likely to purchase the original product and thus to purchase more expensive products, they do show an interest in the original product. One way to further arouse the interest of original products is to increase the quality of the originals. Additionally, management may decide to follow alternative pricing strategies in developing countries. One can think of starting with relatively low prices and perhaps later on increase those prices for newer versions of the originals. Also, increasing brand awareness can help to gain interest of potential customers.

Appendixes of chapter 2

Data appendix A

COUNTRY	PERCENTAGE OF COUNTERFEIT
Venezuela	87%
Indonesia	84%
China	82%
Dominica	79%
Thailand	78%
Panama	74%
Philippines	69%
India	69%
Turkey	65%
Mexico	61%
Malaysia	59%
Brazil	59%
Poland	57%
Puerto Rico	44%
South Korea	43%
UA Emirates	35%
South Africa	34%
Canada	33%
Netherlands	28%
Germany	27%
United Kingdom	26%
Switzerland	25%
Japan	23%
United States	20%

Note: Based on the Software piracy rate obtained from

www.nationmaster.com consulted on October 19 2009. Countries not on

this list, but with shipments recorded, get a score of 50%.

Data appendix B

Table B1: Mobile phones (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	5198.720	1333.280
1997	5389.300	1535.700
1998	1557.910	1093.090
1999	1445.090	364.9100
2000	1818.250	483.7500
2001	3957.520	996.4800
2002	3684.870	2632.130
2003	3816.900	1855.100
2004	587.8300	265.1700
2005	6118.480	2036.520
2006	2944.030	5293.970
2007	2254.480	4175.520
2008	798.9800	254.0200

Table B2: Televisions (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	181292.8	161484.2
1997	287799.1	237610.9
1998	219298.4	216937.6
1999	206709.7	82944.34
2000	309940.5	564297.5
2001	281040.6	194256.4

Continued Table B2: Televisions

2002	203554.2	470819.8
2003	154940.4	334264.6
2004	529283.7	230013.3
2005	369442.1	300435.9
2006	324814.3	400974.7
2007	237721.0	301032.0
2008	169707.9	338280.1

Table B 3: DVDs (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	47815.52	14604.48
1997	60001.68	16891.32
1998	26769.82	7221.180
1999	18767.64	6736.360
2000	33564.41	12525.59
2001	46193.74	15136.26
2002	58997.44	22003.56
2003	129254.5	59259.52
2004	220195.2	160114.8
2005	114575.9	85527.11
2006	91451.60	112959.4
2007	95172.60	88723.40
2008	75173.66	85705.34

Chapter 3

Diffusion of counterfeit medical products in a developing country: Empirical evidence for Suriname

Abstract

Based on detailed shipping figures of Suriname's main harbour in Paramaribo, we estimate the total shipments (in kilograms) of original and counterfeit medical products for 1996-2008 across five product categories. Using various time series techniques, we document that total cumulative shipments of counterfeit products eventually will make about 40% of total shipments. Correlation between the shipment series is on average 0.9, and there are no relevant leads or lags, implying that there are two distinct sets of consumers for original and for counterfeit products.

3.1 Introduction

> **The World Health Organization (WHO) estimates that up to 1% of medicines available in the developed world is likely to be counterfeited. This figure rises to 10% globally, although in some developing countries they estimate one third of medicines are counterfeit"**
>
> (Various internet sites consulted January 2010)

The diffusion of pharmaceutical products has received some attention in the recent marketing literature; see for example Staake et al. (2009). It has been documented that the diffusion patterns show various similarities with the diffusion patterns of durable consumer goods, see for example Desiraju et al. (2004).

As pharmaceutical products may experience the impact of regulatory regimes, diffusion patterns may change direction and slope due to these regimes, see for example Stremersch and Lemmens (2009). In all studies available, there is a strong focus on the diffusion patterns in western countries, usually driven by data availability, although Desiraju et al. (2004) also include data for various developing countries. A common assumption across all studies is that the focus is on

the producer of the pharmaceutical products, usually US or European companies.

In this paper we also address the diffusion patterns of pharmaceutical products where we relegate the focus on the actual shipments of such products in a developing country. This change of focus then naturally has to include the fact that in developing countries many pharmaceutical products are counterfeits. The exact amount of these counterfeit drugs is unknown, and therefore we will provide a method to estimate the fraction of counterfeit products within a single developing country.

Exact data on counterfeit drugs are usually not available, and certainly not in a developing country. One way to estimate the size of the counterfeit market is to try to disentangle the counterfeit diffusion from the total diffusion, as is proposed in Givon et al. (1995) for software products. An alternative would be to estimate it directly from the shipments data, if these would be available, see for example Franses and Lede (2010).

The focus in the present paper is the diffusion of original and counterfeit medical products in the South American country Suriname. Based on detailed data on shipments of products in five distinct categories, we estimate the diffusion of original and counterfeit products

for the sample from 1996 to 2008. With these data, we can analyse the correlations between the two diffusion patterns. Also, we examine the lead and lag structure across original and counterfeit products. Finally, we estimate the total cumulative shipments using the familiar Bass model, and we compare the eventual maturity levels for each of the categories. So, in contrast to what the WHO documents, we provide estimates of the total amount that *in the end* will have found its way to consumers. We are not interested in the actual figures, but merely in the fraction of counterfeit in the total amount.

The main finding in this paper is that counterfeit drugs and other medical products eventually make around 40% of the total shipments in this particular country of Suriname. Note that this fraction exceeds the estimates of the WHO. A second finding is that the two diffusion processes are correlated contemporaneously, reacting similarly to the same outside shocks, but that there is no significant lead or lag relationship. This suggests that the original and counterfeit products each address a distinct segment of the market.

The outline of the paper is as follows. First, in section 2 we describe the data collection and the creation of the two series for original and for counterfeit products. In

Section 3 we analyse the data using basic time series techniques and using familiar diffusion models. Section 4 concludes with a discussion of the main findings and their implications.

3.2   Data collection

We have collected data for the South American country of Suriname. It is a small and open economy, with a single large (maritime) harbour in the capital city of Paramaribo. The country has many natural resources. It used to be a colony of the Netherlands, before it became independent in 1975. Economic growth slowed down since the beginning of the 1980s, but since 2000 there is a steady growth in GDP and an increase in welfare. The country is sparsely populated, with most of the citizens living in the coastal area. Although average welfare is on the rise, the income inequalities in Suriname are quite large. The country boasts a non-negligible group of multi-millionaires, but on the other hand it is estimated that more than 60% of the population is below international poverty levels.

Sales records for medical products do not exist. Hence, we have to estimate the diffusion patterns of these

products using alternative methods. We consulted Statistics Suriname and we were able to collect annual data on the imports of products in five categories for the period 1996 to and including 2008. The product categories are Pharmaceutical items, Medicine, for sale small scale, Medicine, not for sale small scale, Wound-covering materials and Blood items. These imports are measured in kilograms and in total value (in US dollars). We decided to take the weights as the measurement unit to avoid correction for inflation in the exporting countries. Crucial for our purposes is that we have information on the countries of origin of the shipments. In Appendix A, we give the countries of origin, and we indicate from which countries which products in the five categories, originate. Clearly, Suriname imports from a long list of countries, and there is also variation across the categories.

To estimate the shipments of original products and counterfeit products, we use the software piracy index, which can be obtained from www.nationmaster.com. This website presents a list of countries and gives an estimate of the fraction of products (here: computer software) that are most likely counterfeit. In Appendix B we provide a list of relevant countries for our product categories and the corresponding percentages. Like this list, we shall take it as

likely that 23% of the pharmaceutical products that are imported from Japan amount to counterfeit products, and that it is as much as 82% of these products originating from China that are counterfeits. Of course, we shall never be certain whether these percentages also hold for our product categories, nor if this figure changes over time or amounts to a biased estimate, and hence the subsequent data should not be considered as exact amounts, but merely as estimates. That is, the absolute numbers do not matter, but their time series properties do. In order to allow the reader to verify the computations about which we report in the next section, we present our data in Appendix C. Graphical details and other aspects of these series will be discussed in the next section.

3.3   Analysis of shipments data

This section deals with the statistical analysis of the two diffusion series. We analyse the levels of the shipments, as in Appendix C, and the cumulated shipments. The latter are used to estimate the eventual total size of the market. The first pairs of series are analysed to see if there are leading or lagging diffusion processes amongst the two series. We

discuss the methodology, first for cumulative shipments and then for shipments themselves, and we discuss the results in each of the five categories.

3.3.1 Methodology for cumulative shipments

We denote the level of the original products shipments as O_t and the level of the shipments of counterfeits as C_t where $t = 1996, 1997, ..., 2008$. The data appear in the Appendix C. We also compute the cumulative shipments, and label these as CO_t and CC_t. Graphs of the series for the five categories appear in Figures 3-1 to 3-5.

The second panel of each of these Figures suggests that the cumulative shipments obey a product life cycle that can also be observed in the diffusion of durable products.

Hence, the first part of our methodology involves considering diffusion models to estimate the inflection points and the ultimate maturity levels of these cumulative series.
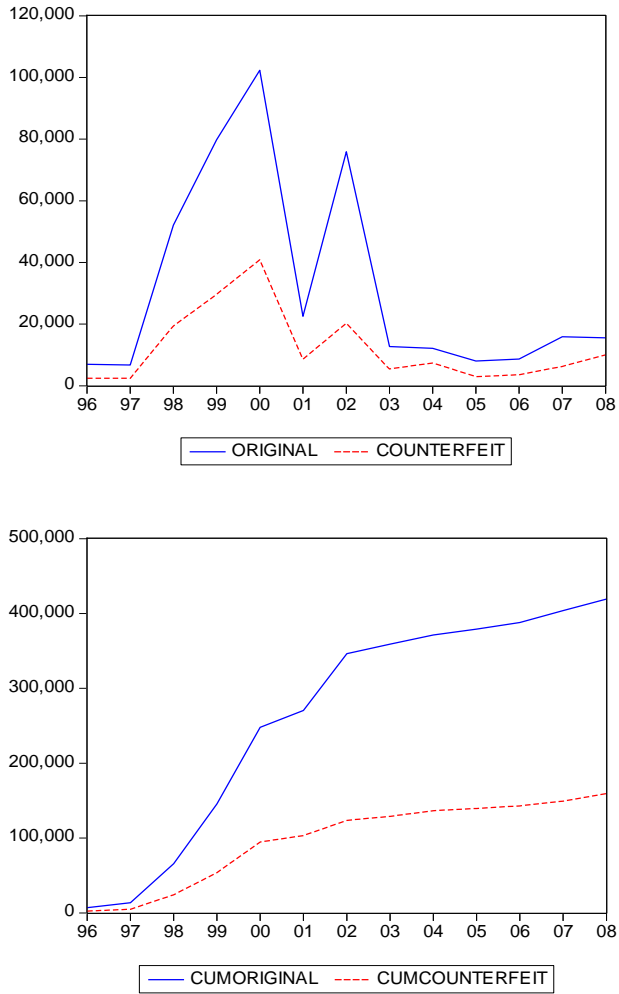
Figure 3- 1: Shipments and cumulative shipments of original (above) and counterfeit (below) products: Pharmaceutical items
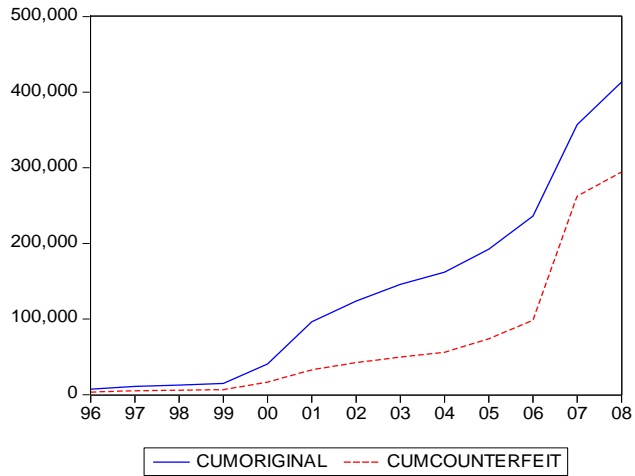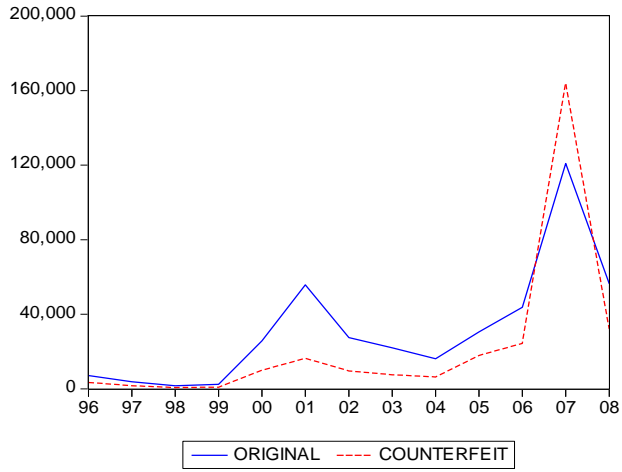
Figure 3- 2: Shipments and cumulative shipments of original (above) and counterfeit (below) products: Medicine, for sale small scale
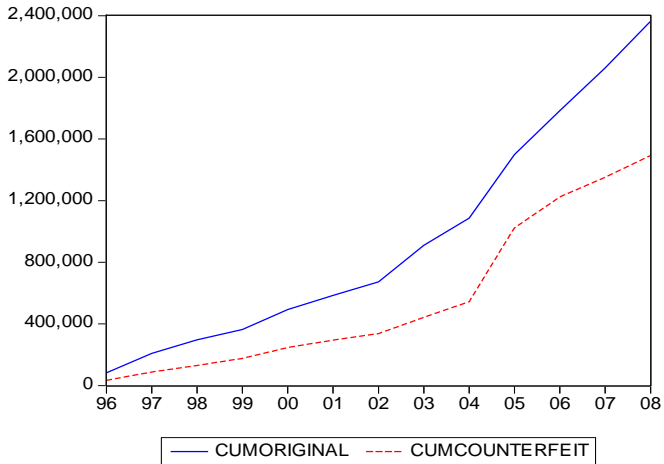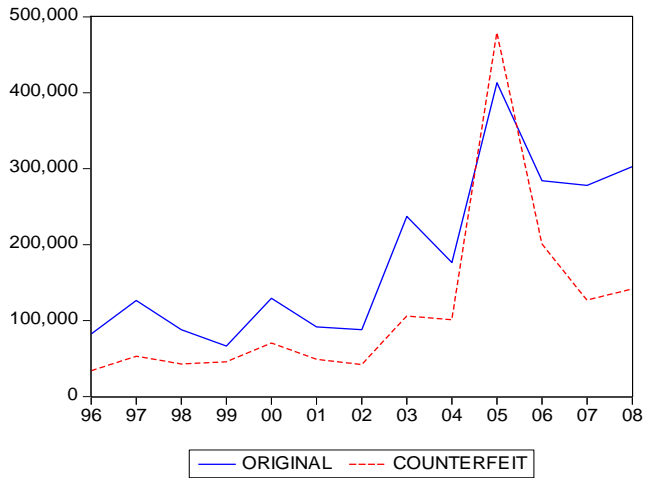
Figure 3- 3: Shipments and cumulative shipments of original (above) and counterfeit (below) products: Medicine, not for sale small scale
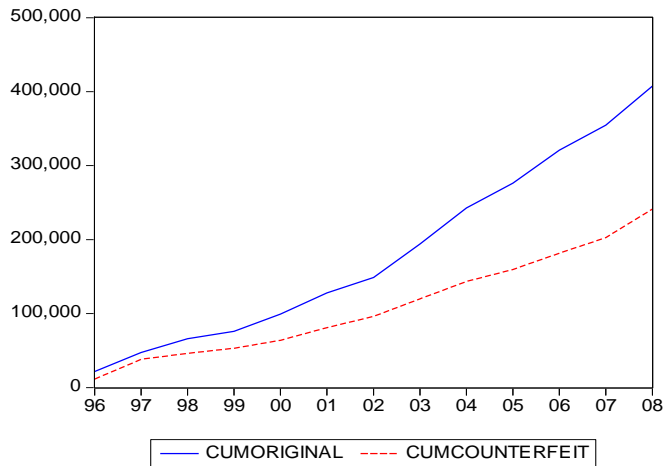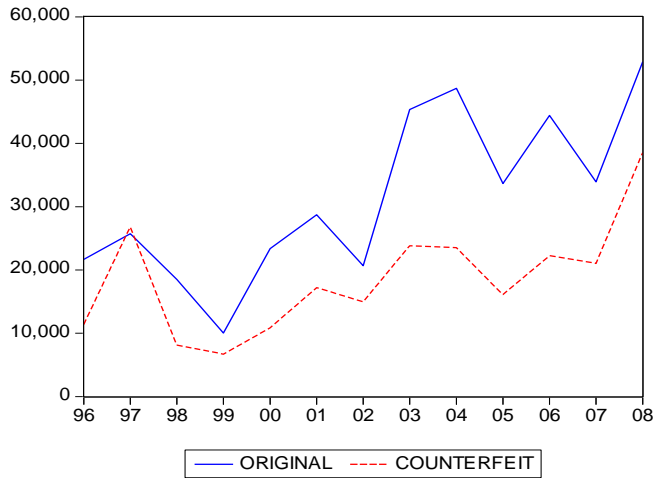
Figure 3- 4: Shipments and cumulative shipments of original (above) and counterfeit (below) products: Wound covering materials
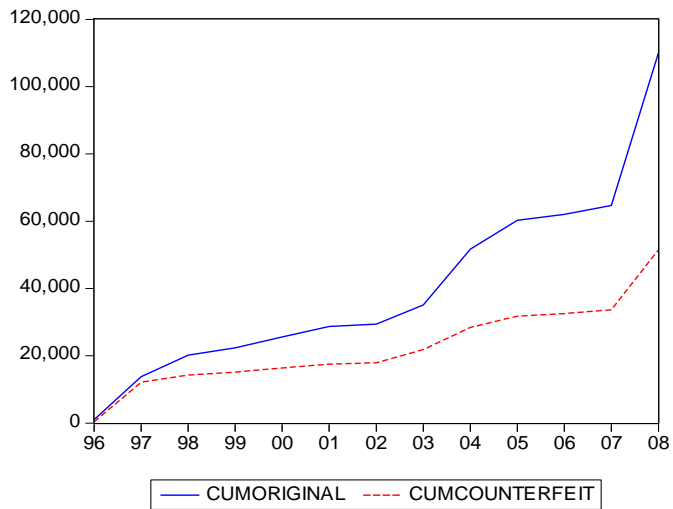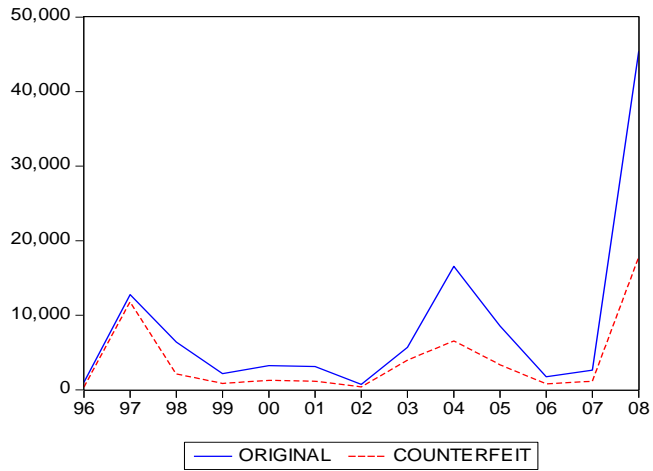
**Figure 3- 5: Shipments and cumulative shipments of original
and counterfeit products: Blood items**

For the CO_t and CC_t variables, we consider the familiar Bass model (Bass, 1969), which in our notation can be written in regression format as:

(1)

$$O_t = p_o m_o + (q_o - p_o)CO_{t-1} - \frac{q_o}{m_o} CO_{t-1}^2 + \varepsilon_t$$

and

(2)

$$C_t = p_c m_c + (q_c - p_c)CC_{t-1} - \frac{q_c}{m_c} CC_{t-1}^2 + v_t$$

for originals and counterfeits, respectively. The parameters p and q characterize the shape of the diffusion pattern, and determine the location of the inflection point I which can be calculated as:

(3) $$I = \frac{1}{p+q} \log(\tfrac{q}{p})$$

The parameters in the Bass model may be difficult to estimate in case the data do not yet include the inflection point. If this happens, we replace the Bass model by the symmetric logistic curve, given by:

$$(4) \qquad OC_t = \frac{m_o}{1 + \exp(-\gamma_o(t - I_o))}$$

and

$$(5) \qquad CC_t = \frac{m_c}{1 + \exp(-\gamma_c(t - I_c))}$$

for originals and counterfeits, respectively. Here the parameter γ characterizes the shape of the curve, and again I corresponds with the timing of the inflection point. Due to the imposed symmetric nature of the logistic curve, one can still adequately estimate the location of the inflection point, even when it is not included in the sample. The estimation routine is Nonlinear Least Squares. In both cases, that is the Bass model and the logistic curve, our interest lies in the parameters m, the ultimate level of total shipments, and I, the location of the inflection point.

Table 3- 1: Fraction of counterfeit shipments over total shipments, based on estimates of the eventual maturity level

VARIABLE		ESTIMATED MATURITY LEVEL		
		Original	Counterfeit	Fraction
(A)	Pharmaceutical items	396066	148209	0.272
(B)	Medicine, for sale small scale	1283915	1262614	0.496
(C)	Medicine, not for sale small scale	4463491	2128846	0.323
(D)	Wound-covering materials	582769	386618	0.399
(E)	Blood items	372778	267351	0.418
			Average	0.382

Note: The Bass model is used for (A), while the logistic model is used for (B), (C), (D) and (E).

In Table 3-1 we present the present the estimates of the maturity level. We also compute the fraction of m_c over $m_o + m_c$. As said, this latter fraction is most relevant for our purposes. Table 3-1 suggests that it can range from about 0.3 to 0.5, with an average close to 0.4. In words, about 40% of the eventual total shipments in medical products in Suriname concerns counterfeit products. It is

interesting to see that the variation of the estimate of the fraction across the five product categories is quite small.

Table 3- 2: Estimated inflection points for original and counterfeit shipments

VARIABLE		ESTIMATED INFLECTION POINT	
		Original	Counterfeit
(A)	Pharmaceutical items	1999	1999
(B)	Medicine, for sale small scale	2010	2010
(C)	Medicine, not for sale small scale	2008	2006
(D)	Wound-covering materials	2005	2006
(E)	Blood items	2013	2018
Note: The Bass model is used for (A), while the logistic model is used for (B), (C), (D) and (E).			

Table 3-2 gives the estimates of the inflection points. For two of the five categories the years with these points coincide. For Medicine, not for sale small scale, the inflection point of counterfeits occurred earlier, suggesting that the maturity level for this series is attained earlier than for the original products. For two categories the counterfeit series peak later, with for Blood Items meaning that in the next few years still a substantial amount of counterfeit

products will be imported in Suriname, at least, if the current situations persists.

3.3.2 Methodology for shipments

The graphs in Figures 3-1 to 3-5 seem to suggest that shipments of original and of counterfeit products show similar diffusion patterns. It is of interest to see if one of the two series is leading (or lagging). Indeed, in Franses and Lede (2010) it was documented that original products' diffusions lead that of counterfeits.

To examine leads and lags relations, we estimate a vector auto-regression of order 1 (VAR(1)), which consists of the following two equations:

(6) $$O_t = \mu_1 + \beta_1 C_t + \rho_1 O_{t-1} + \delta_1 C_{t-1} + \varepsilon_t$$

and

(7) $$C_t = \mu_2 + \beta_2 O_t + \rho_2 O_{t-1} + \delta_2 C_{t-1} + v_t$$

Note that a genuine VAR (1) model would not include current C_t and O_t, but here it allows for a partial correction

for current effects. The test of interest concerns the joint significance of ρ_1, δ_1 in (6) and of ρ_2, δ_2 in (7).

Table 3- 3: P-values of the F-test for the joint relevance of one-year lagged shipments of original products and one-year lagged shipments of counterfeit products

(Each equation contains an intercept and current sales of the other variable)

VARIABLE	DEPENDANT VARIABLE	
	Original	Counterfeit
Pharmaceutical items	0.933	0.806
Medicine, for sale small scale	0.119	0.382
Medicine, not for sale small scale	*0.038*	0.325
Wound-covering materials	0.389	0.840
Blood items	0.653	0.529

In Table 3-3 we present the p values of the F tests. Except for the category Medicine, not for sale small scale, we find that these parameters are not significantly different from zero. For the exceptional category, we learn that lagged shipments of originals leads current shipments of originals. So, in sum, there is no leading or lagging variable across originals and counterfeits.

Table 3- 4: Correlation between shipments of original products and of counterfeit products

VARIABLE	CORRELATION BETWEEN SERIES
Pharmaceutical items	0.973
Medicine, for sale small scale	0.914
Medicine, not for sale small scale	0.871
Wound-covering materials	0.835
Blood items	0.932
Average	0.905

Table 3-4 gives the contemporaneous correlation between the two series, and it is quite evident that this correlation is high.

In sum, we find that original and counterfeit medical products follow similar diffusion patterns and that no series is leading or lagging the other. When it is assumed that all individuals in Suriname are equally likely to need medical products, our findings suggest that the shipments address two distinct segments of consumers. There is demand for original products and there is demand for counterfeit products, with the demand for originals in the end being 1.5 times as large as demand for counterfeits, as the fraction of counterfeits in the total shipments is 40%.

3.4 Conclusion

In addition to the available global estimates of the WHO, we provide detailed estimates of shipments of original and counterfeit medical products in the South American country of Suriname. The numbers of these estimates are not particularly relevant, as we are interested in the relative numbers and the current and dynamic correlations across the two series. When we analyze the diffusion patterns, we see that total shipments (to be observed many years from now) will cover about 40% counterfeits. Moreover, we see that current correlation is high, and that there are no relevant leads or lags. Hence, the two types of shipments seem to address two distinct clusters of consumers.

In Franses and Lede (2010) it was documented that for shipments of durable products like televisions, mobile phones and DVDs slightly different results appeared, but the notion of having two clusters of consumers was also addressed in that study. A first and immediate conclusion that one could draw is that original products would find their way to a richer set of consumers, while the counterfeit products would be targeted at the poorer part of the country. This conclusion could be plausible at first sight, but needs much more refined analysis. This conclusion would assume

that all consumers are similarly in need for medical products. It could however very well be that poorer inhabitants of Suriname are less often ill than richer inhabitants are. Similarly, why would poorer individuals have the same demand for products like DVDs and for certain specific medical products? More research on this issue is clearly needed.

3.5   Policy implications

For Suriname we emphasize that the battle against counterfeit pharmaceutical products is one that asks much effort on the part of the Surinamese government. As a member of the WHO, this country needs to make greater effort to adopt the WHO schemes and to make more use of the information, instructions, and opportunities presented by this organization's global coalition of stakeholders, that is, the International Medical Products Anti-Counterfeiting Taskforce (IMPACT). The Surinamese government needs to tighten the relevant legislation and regulations so that substantial fines and even more appropriate prison sentences can be declared against those persons and

organizations who engage in the import and sale of counterfeit pharmaceuticals.

Furthermore, the Surinamese government needs to raise the awareness of the citizens. The majority of the citizens have no background information on the pharmaceutical products they use, let alone on how to detect counterfeit versions among the original pharmaceuticals. Of course, not all original pharmaceuticals are as simple to distinguish from counterfeits, as others. However, there are counterfeit pharmaceuticals which people can detect with little effort. Government must take the leading role in empowering the citizens by adequately informing them about how to determine the originality of pharmaceuticals. Surinamese government must also inform the inhabitants about the fatal consequences of counterfeit versions of pharmaceutical products, and thus the great health risks these products may inflict on those who use them. This tightening of the government's policy in the battle against counterfeit pharmaceuticals is very likely to result in a significant reduction of the trade in these products in Suriname, and hence reduce the risk of exposure to the dangers of these products. Moreover, not only legislation and regulation policy needs to be tightened, but also the

policy regarding control and the effective implementation thereof, needs to be taken into account.

Additional to the Surinamese government, there are at least three stakeholders that can also play a role in this battle. The first stakeholder is customs. Since it is suspected that large portions of counterfeit pharmaceuticals are smuggled into the country, this stakeholder will need to improve its control concerning the import of these products. Stricter control, combined with tight legislation and regulation will enable the custom officials to increasingly contribute to reducing the import of and the trade in counterfeit pharmaceuticals.

The second stakeholder, that is, the Pharmaceutical Inspection, the control mechanism of the Surinamese government with regard to the pharmaceutical products, is responsible to inspect and control the pharmaceutical market. This department is supported by the Office for Pharmaceutical Supply in Suriname. The latter focuses on the quality controls of locally produced and imported drugs. The Pharmaceutical Inspection, small in size, may lack the capability to optimally inspect and control the pharmaceutical business in Suriname. We suggest that the government increases its support to these organizations.

The final stakeholder is the consumer. As the citizens (but also hospitals and similar institutions) ultimately determine the extent to which the sale of products increase or decrease, this stakeholder also needs to participate in reducing the trade in counterfeit pharmaceuticals in Suriname. Of course, before customers are able to consciously choose to purchase and use original pharmaceutical products, first and foremost they will need to be adequately informed about the disadvantages of counterfeit pharmaceuticals. Furthermore, they will need to be informed about how to detect the counterfeit pharmaceuticals from the original versions.

Appendixes of chapter 3

Appendix A: Import from countries

COUNTRIES	PRODUCT CATEGORY				
	A	B	C	D	E
Antigua			x	x	
Dutch Antilles	x		x	x	x
Aruba				x	
Australia	x		x		
Austria			x	x	
Bahamas	x				
Barbados	x	x	x		
Belgium	x	x	x	x	x
Brazil	x	x	x		x
Canada	x	x	x	x	x
China	x	x	x	x	x
Colombia	x		x	x	
Costa Rica	x		x		
Cyprus	x		x		
Denmark	x		x		x
Egypt			x		
El Salvador			x		
United Emirates				x	
French Guyana	x	x		x	x
France	x	x	x	x	x
Germany	x	x	x	x	

Continued (A) COUNTRIES	A	B	C	D	E
Greece			x		
Guatemala	x		x		
Guyana	x		x	x	
Hungary					x
India		x	x	x	
Indonesia		x	x	x	
Israel			x		
Ireland	x	x			
Italy					x
Jamaica	x				x
Japan	x		x	x	
South Korea	x	x	x	x	x
St Lucia	x				
Mexico			x		x
Namibia	x				
Netherlands	x	x	x	x	x
New Zealand			x		x
Niger	x				
Norway					x
Panama	x	x	x	x	
Portugal	x			x	
Puerto Rico	x	x	x	x	
Russia			x		
San Marino			x		

Continued (A) COUNTRIES	A	B	C	D	E
South Africa	x				
Spain	x				
Taiwan			x	x	
Thailand		x	x	x	x
Trinidad and Tobago	x	x	x	x	
United Kingdom	x	x	x	x	
United States	x	x	x	x	x
Venezuela	x				
Zweden	x		x		
Zwitserland	x	x		x	x

(A) Pharmaceutical items, (B) Medicine, for sale small scale, (C) Medicine, not for sale small scale, (D) Wound covering materials and (E) Blood items

Appendix B: Percentage of products that is counterfeit

COUNTRIES	PERCENTAGE OF COUNTERFEITS	COUNTRIES	PERCENTAGE OF COUNTERFEITS
Antigua	50	Dutch Antilles	50
Aruba	50	Australia	28
Austria	25	Bahamas	50
Barbados	50	Belgium	25
Brazil	59	Canada	33
China	82	Colombia	58
Costa Rica	61	Cyprus	50
Denmark	25	Egypt	60
El Salvador	81	United Emirates	35
French Guyana	42	France	42
Germany	27	Greece	58
Guatemala	80	Guyana	50
Hungary	42	India	69
Indonesia	84	Israel	32
Ireland	34	Italy	49
Jamaica	50	Japan	23
South Korea	43	St Lucia	50
Mexico	61	Namibia	50
Netherlands	28	New Zealand	22
Niger	50	Norway	29
Panama	74	Portugal	43
Puerto Rico	44	Russia	73
San Marino	50	South Africa	34
Spain	43	Sweden	25
Switzerland	25	Taiwan	40

Continued (B) COUNTRIES	PERCENTAGE OF COUNTERFEITS	COUNTRIES	PERCENTAGE OF COUNTERFEITS
Thailand	78	Trinidad and Tobago	50
United Kingdom	26	United States	20
Venezuela	87		

Note: When a country does not appear on the list,
we use the score 50.

(Based on the software piracy rate, www.nationmaster.com, consulted December 2009)

Appendix C: The data

Table C1: Shipments of original and counterfeit products: Pharmaceutical items, general (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	6984.57	2437.43
1997	6726.67	2404.33
1998	52109.53	19346.47
1999	79784.1	29644.9
2000	102338.1	40856.93
2001	22542.07	8584.93
2002	75868.91	20278.09
2003	12747.33	5462.67
2004	12117.31	7397.69
2005	8025.62	2938.38
2006	8639.09	3554.91
2007	15909.47	6238.53
2008	15565.72	10033.28

Table C2: Shipments of original and counterfeit products: Medicine, for sale small scale (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	7140.12	3402.88
1997	3721.98	1606.02
1998	1631.59	673.41
1999	2360.47	818.53
2000	25662.14	9946.86
2001	55775.76	16261.24
2002	27512.91	9549.09
2003	22004.05	7445.95

Continued Table C2 Shipments of original and counterfeit products: Medicine, for sale small scale

YEAR	ORIGINAL	COUNTERFEIT
2004	16083.69	6314.31
2005	30502.89	17907.11
2006	43727.94	24332.06
2007	120884.8	164090.2
2008	56326.23	32061.77

Table C3: Shipments of original and counterfeit products: Medicine, not for sale small scale

(in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	82410.42	34027.58
1997	126437.3	53107.74
1998	87937.55	42676.45
1999	66519.33	45686.67
2000	129504.3	70367.69
2001	91668.09	48919.91
2002	88133.77	42033.23
2003	237083.1	105841.9
2004	176400.2	101030.8
2005	413139.4	479416.6
2006	284124.9	200984.2
2007	278071.7	127044.3
2008	302822.2	141556.8

Table C4: Shipments of original and counterfeit

products: Wound covering materials (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	21680.89	11375.11
1997	25731.19	26771.81
1998	18485.6	8128.4
1999	10025.28	6677.72
2000	23374.1	10868.9
2001	28716.47	17209.53
2002	20663.89	14954.11
2003	45351.56	23804.44
2004	48713.34	23512.66
2005	33667	16122
2006	44422.59	22254.41
2007	33909	21029
2008	52893	38540

Table C5: Shipments of original and counterfeit

products: Blood items (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT
1996	1007.85	364.15
1997	12778.71	11796.29
1998	6391.8	2106.2
1999	2160.36	838.64
2000	3251.14	1259.86
2001	3112.78	1131.22
2002	731.46	370.54
2003	5704.68	3990.32
2004	16571.03	6558.97

Continued Table C5: Shipments of original and counterfeit products: Blood items

ORIGINAL	ORIGINAL	ORIGINAL
2005	8564.73	3352.27
2006	1759.19	777.81
2007	2634.27	1126.73
2008	45435.9	17764.1

Chapter 4

Cultural norms and values
and purchases of counterfeits

Abstract

We conjecture that an important driver of individual purchases of counterfeit products is cultural norms and values. To put this conjecture to an empirical test we make use of the unique situation of Surinamese people who live in Suriname and in the Netherlands and who might share the same norms and values but certainly not their respective income levels and demographics. Holding newly collected data from surveys amongst Surinamese individuals in the Netherlands and in Suriname against a control group of Dutch individuals in the Netherlands, we present evidence that cultural norms are indeed a key driver for purchases of counterfeit products. Implications for policy are discussed.

4.1   Introduction

Fake, counterfeit, imitation, illicit or pirated goods, these are all products or goods that are associated with original goods being copied without the authorisation of the owner of the intellectual property.

With intellectual property we mean copyrights and related rights, trademarks, geographical indications, patens, lay-out designs of integrated circuits, and undisclosed information (see WTO 2012). These un-original products are packaged identically to the originals, as a means to obtain financial benefit (OECD 2007-a). In this paper we take all these products as one single category.

The people and organisations who produce and distribute counterfeit and pirated goods are interested in those types of goods which produce high profit margins (in profitable markets), with low or at least acceptable risks. If the potential benefits to produce and distribute the counterfeit or pirated goods exceed the potential risks of detection and the potential penalties, the counterfeiters and/or pirates will produce and distribute these illicit goods (OECD 2007-b).

4.1.2   Some figures

Research done on the responsibility of the secretary-general of the Organisation for Economic Co-operation and Development (OECD), documented in the report *'The economic impact of counterfeiting and piracy'* (OECD 2007-b) has shown that virtually every economy has to deal with counterfeit and/or pirated products, either in terms of the production or the distribution of these goods. Furthermore, it is reported that the impact of the production and distribution of counterfeit and pirated goods tends to be larger in developing countries than in developed countries. OECD (2007-b), suggests that Asia is the largest source for counterfeit and pirated goods, with China as the single largest source economy. This finding is confirmed by data of the International Anti-Counterfeiting Coalition Inc. (IACC), a non-profit organisation in the United States of America, which is devoted solely to combating product counterfeiting and piracy (IAAC 2011).

Over the years, almost every type of good has been counterfeited and/or pirated, and the numbers are believed to increase, see OECD (2007-b) and Dixon and Greenhalgh (2002). Analysis carried out by the OECD in 2005 has led to believe that the international trade in counterfeit and

pirated products made up for USD 200 Billion of the total international trade. In the OECD's 2007 (b) report on this matter it is emphasized that this above-mentioned estimate, which exceeds the Gross Domestic Product (GDP) of about 150 economies around the world, might be several hundred billion dollars less than the real figure, given that it is impossible to detect all of the goods that are the product of counterfeiting and piracy. Moreover, the figure excludes counterfeit and pirated goods that are produced and distributed domestically or via the internet.

More recent estimates of the economic impact of counterfeit and pirated goods were made by the Business Action to Stop Counterfeiting and Piracy (BASCAP). BASCAP, which was initiated by the International Chamber of Commerce (ICC), based their estimates on the figures published by the OECD in their report which was issued in 2008. BASCAP summed the OECD's (estimated) figures regarding international and domestic trade in counterfeits and pirated goods including digital piracy. BASCAP's (2011) total estimated amount for the trade in counterfeit and pirated goods for 2008, ranged between USD 455 Billion and USD 650 Billion. This estimated amount is expected to range between USD 1220 Billion and USD 1770 Billion by 2015.

It is not only the international trade that has suffered from the impact of counterfeit and piracy activities. The OECD concludes in the 2007 (b) report that national economies, of developing as well as of developed countries, have suffered from the effects of these unlawful acts as well. Developing countries are found to have suffered more, due in part to the relatively weak enforcement in most of these developing countries. Furthermore, the increase of criminal activities, including tax evasion, the loss of foreign direct investment (FDI) and the issues around employment, environment and economic growth, are reported as the main negative effects of counterfeiting and piracy on national economies. In their 2007 (b) report the OECD also identifies that the owners of the intellectual property and the (deceived) consumers of counterfeit and pirated goods are the victims of the illegal activities of counterfeiters and pirates. Moreover, the consumers of counterfeit and pirated goods suffer from lower consumer utility and potentially from health and safety risks (Dixon and Greenhalgh, 2002; Scorpecci, 2009).

4.1.2 Our study

One particular motivation for consumers to consciously purchase counterfeit products, which is usually considered as the dominant motivation, is the potential savings of the consumers. This is particularly so for developing countries, which is the type of country of our interest in this paper. Various other motivations for individuals to purchase counterfeits are reviewed in Bian and Moutinho (2009, 2011), Bian and Veloutsou (2007), Commuri (2009), Cordell et al. (1996), Eisend and Schuchert-Güler (2006), and Wee et al. (1995), amongst many other studies. Counterfeit products may be cheaper and hence lower-income households, or people in lower-income (developing) countries, might be more prone to purchasing such counterfeits.

In the present paper we aim to add to the literature by putting forward another motivation to purchase counterfeits, which has to do with cultural norms and values. Some studies exist on the cultural aspects of counterfeits, see for example Kwong et al. (2003), Lai and Zaichkowsky (1999), Tan (2002), Wang et al. (2005), where typically the focus is on Asian individuals. However, all these studies are only based on interviews for one particular group of

individuals and never include control groups (like Asians living outside Asia and non-Asians living in Asia). In our study we address this omission.

Norms and values have been seen to be relevant in other situations concerning illegal activities, see Fisman and Miguel (2007), and perhaps they are of relevance here too. To empirically examine this possibility, we collect detailed survey data on three groups of individuals which in various dimensions should be similar while in others are very dissimilar. In short, we interview Surinamese individuals in Suriname (a developing country), Surinamese individuals in the Netherlands (an OECD country) and Dutch individuals in the Netherlands. Our main focus will be on the similarities and differences across these three groups, where the first two would be more similar in terms of cultural norms and values, whereas the last two groups would be more similar in terms of income.

Our key finding is that even though income levels are about 10 times as high in the Netherlands than in Suriname, the preferences for counterfeit products are about twice as high for Surinamese individuals, also when it concerns Surinamese individuals living in the Netherlands. We associate this latter result with similarities in norms and values of Surinamese individuals.

The outline of our paper is as follows. First, we discuss some aspects of the relevant literature on the consumer motivations to purchase counterfeit products. Next, we discuss the data collection and the survey questions that we used. Then we turn to the results, where we analyze similarities and differences across the three groups of individuals. We conclude with a discussion and the main implications from our study.

4.2   Theoretical background

4.2.1   Overview

With an increase in global trade, currently involving almost all countries in the world, interest is growing in studying various aspects of trade in counterfeit products. Motivations for consumers to purchase counterfeit products are receiving attention, in particular when they are aware that the products are indeed counterfeits; see Bian and Moutinho (2009), Tom et al. (1998) and Wilcox et al. (2009). Interestingly, these studies all concern consumers in western countries (most notably the USA), and as such these studies address only one part of the story.

Amongst other motivations, a commonly appreciated and accepted motivation for consciously purchasing counterfeit products is income or price, most certainly for developing countries. The price of the original product can be much higher than that of a counterfeit, while the difference in quality might be perceived as not that large. When prices are perceived as higher, then certainly lower-income households will be more inclined to purchase fake products. This behaviour may concern luxury goods (think of top brand fashion bags, sunglasses or watches), but also medication (like aspirins and anti-depressiveness medicines). The consumption of counterfeits might therefore be higher in developing countries, relative to developed countries, as the first countries have more households with low incomes. Indeed, in 2010 the World Health Organization estimated that up to 10% of medicines used are likely to be counterfeited, whereas in some developing countries this number might even be close to one third.

There are quite a few studies on the drivers of the consumption of counterfeit products. However, these studies typically cover developed countries, with a few exceptions. Kwong et al. (2003) and Casola (2007) document that there is apparently no (self-stated) relation

between purchase intention and income. In contrast, Wee et al. (1995), Ang et al. (1999) and Tom et al. (1998) report that lower income levels do make people to have a more positive attitude towards counterfeit production and sales, in general. Furthermore, Albert-Miller (1998) and Tom et al. (1998) do report an effect of price on the intent to purchase counterfeit products.

4.2.2 Could cultural norms matter too?

In sum, there seems to be consensus, and the consensus does have clear face value, that price of the original products versus the fake products and the individual income level are amongst the drivers of counterfeit purchases and purchase intents. In the present paper we wish to examine if there is a potential other driver and this concerns cultural norms, where we explicitly incorporate control groups to allow for conclusive statements. Our conjecture is based on the innovative and interesting outcomes reported in Fisman and Miguel (2007) where it turned out that response, to changes in policy concerning potential illegal activities, differed across nationalities and cultures. In terms of our study, we wonder whether it could be that appreciation and adoption of counterfeit products is in part also governed by

cultural norms. That cultural norms could make a distinction concerning counterfeits has also been documented in Vittel (2003) and Harvey and Walls (2003), comparing different countries.

To be able to study this possibility we need to discern groups of individuals which might share cultural norms but who differ in their income levels and perceived price levels. We believe we have found such a situation for the people who live in the South American country of Suriname and the Surinamese individuals who live in the Netherlands. We will examine to what extent these two groups share values and norms, and we compare their income levels and ask for their appreciation and adoption of counterfeit products.

4.3   Data collection

We collected our data in Suriname, a South-American country with a developing economy, and in the Netherlands, a member state of the European Union (EU) with a developed economy. Suriname borders with Guyana in the west, French Guyana in the east, and Brazil in the south. The Caribbean islands are located north of the country of

Suriname. The Netherlands is in Western Europe, north of Belgium and west of Germany.

4.3.1   The countries

According to the most recent estimate (2010) of the General Bureau of Statistics of Suriname (GBS), Suriname had a population of 531,170 inhabitants. In addition, GBS estimated that the majority of the population (89%) was younger than 59 years, with generally slightly more males than females. The Surinamese population has a rich diversity of ethnic groups, and thereby Suriname has a rich cultural diversity. As stated by Economy Watch, in 2010 Suriname had a GDP Per Capita (PPP in USD) of USD 8,924.20. Compared to other countries, Suriname ranked 87th in the world rankings according to GDP Per Capita (PPP).

Statistics Netherlands (CBS, 2011) reported 16.7 million inhabitants for this country, of which the majority (85%) was younger than 65 years. The Netherlands is inhibited by slightly more women than men. In addition, CBS noted a number of about 1.9 million inhabitants (11%) of non-western origin, of which 342,000 (18%) are Dutch inhabitants of Surinamese origin of various ethnicities.

Given that Suriname and the Netherlands share the same official language (Dutch), most overseas Surinamese do live in the Netherlands, which makes that approximately 40% of Suriname individuals worldwide live in the Netherlands, and about 60% live in Suriname. According to Economy Watch in 2010 the Netherlands had a GDP Per Capita (PPP) of USD 40,764.55, ranking this country on the 10th place in their world rankings.

4.3.2   History

Suriname and the Netherlands have a relationship that dates back to shortly before the year 1667, when the Dutch traded New Amsterdam, nowadays New York, for Suriname, with the British. This meant that Suriname came formally under Dutch ruling, after being a British settlement for several years. Suriname remained a colony of the Netherlands until November 25, 1975.

Around 1975 there were several developments that stood at the beginning of the current situation with many Surinamese living in the Netherlands. There was unrest amongst parties which were in favour of independence and those which opposed it. Around that time, the economic situation in Suriname deteriorated, and together with

uncertainty about the future development of the country, large parts of the Surinamese population emigrated, in particular to the Netherlands, briefly before and around the time the independence became a fact in 1975, see Choenni and Harmsen (2007, p. 74) and Nicholaas and Sprangers (2007, p. 40).

According to Nicholaas and Sprangers (2007, p. 41) there was another influx of Surinamese people to the Netherlands in the years 1979 and 1980, as a result of the so-called "*Toescheidingsovereenkomst*" between the Netherlands and Suriname. This agreement offered Surinamese the opportunity to choose the Dutch nationality up to five years after the independence of Suriname. Choenni and Harmsen (2007) also report that a significant number of Surinamese inhabitants migrated to the Netherlands in the early 1990's. This was possibly influenced by the then poor economic situation in Suriname. The Netherlands has always been the preferred option for emigration. Our forthcoming results may therefore also be an example that cultural values are inherited by further generations in other countries, see Luttmer and Singhal (2011).

Even though the people of Surinamese origin (with Dutch passports) generally are rather well assimilated

within in the Dutch society, most of them still retain a strong relationship with the country of origin and their family members who still live in Suriname. Statistics of the Surinamese Ministry of Transportation, Communications and Tourism showed that in 2008 approximately 64% of all visitors (137,421) to this country came from the Netherlands. Given the fact that a large portion of the Dutch people of Surinamese origin still retains a relationship with this country, it is likely that the majority of the Dutch visitors may be of Surinamese origin. In addition, in 2009 Statistics Netherlands (CBS) investigated the foreign money transfers from the four largest ethnic groups (associated with Suriname) in the Netherlands, and they found that in 2006 nearly a quarter of immigrant households said to have transferred money abroad, especially to parents, relatives or friends. The year average was EUR 165.00 (approximately USD 215.84) per household. The highest proportion, namely more than 35 percent, is found to be among Dutch people from Surinamese origin. In addition, the report showed that in 2006 this group also had the highest year average of the amount of money transferred, namely EUR 225.00 (approximately USD 294.33) per household.

4.3.3　Data collection by surveys

We collected data using basic survey techniques. We asked the same questions to three groups of individuals. For the sake of notation and discussion we abbreviate these groups as Surinamese individuals in Suriname (A), Surinamese individuals in the Netherlands (B) and Dutch individuals in the Netherlands (C). Data on A and B were collected by us personally (with the help of a few assistants), while data on C were collected by a professional marketing research agency.

The 225 individuals in Suriname were contacted (in the spring of 2011) by two of our assistants, who approached respondents in person at school, at work, and while participating in social activities, asking them to participate in the survey. Convenience sampling was used to select the respondents, although it was made sure that (approximately) a reasonable reflection of general demographics could be found amongst the 225 individuals. Data collection took about two months.

The Netherlands-based individuals of Surinamese origin (B, with 108 individuals) were contacted by email by the second author in the fall of 2010. These individuals were alerted to a web-based survey. The second author is

familiar with the Surinamese community in the Netherlands, and as such could make sure that there would be diversity across the respondents (in terms of ethnicity and income levels). The collection of this sample was rather time-consuming (two months), and hence we managed to collect data only for 108 individuals. Below we will learn that despite this somewhat smaller sample, the results appear to be quite conclusive.

Finally, the control group (C) containing the Dutch individuals in the Netherlands were contacted by a professional marketing research bureau in the fall of 2011. This company collected data until they had a response of 200 individuals. Based on their data files, this company could filter out Surinamese individuals from their records, and so they could make sure that all 200 respondents are born and raised Dutch individuals. So, also Dutch citizens with a Moroccan or Turkish background were not included.

The three groups (A, B and C) received the same questionnaires (except for some questions about ethnicity to group C), and this allows us to compare the answers across the groups.

An important component of our survey concerns the norms and values of the individuals in the three groups. Fritzsche and Oz (2007) observe that even though there are

different wordings used to define these terms, various definitions generally lead to the observation that values affect behaviour. Rokeach and Ball-Rokeach (1989) define a value as 'an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end state of existence'. In order to disclose more about individuals' values, Rokeach designed the so-called 'Rokeach Value Survey' (RVS). The RVS appears to be the most frequently used instrument for measuring human values. The RVS consists of concepts of the most desirable values that are rank-ordered in terms of their importance as guiding principles in a personal life, see Rokeach and Ball-Rokeach (1989) and Kamakura and Mazzon (1991), amongst others.

In the Appendix in Table A1 below we give the relevant items that we also used to assess and to score the norms and values of the individuals in our three groups of interest.

In the same Appendix in Tables A2 and A3 we present our own questions about the values concerning counterfeit products relative to original products (A2) and the values concerning the production and sales of counterfeits (A3). We will use the scores on these questions

to compare the individuals in the three respondent groups. We admit that these questions have never been used before and in this study they are used for the first time. To see if these questions have some merits, we will compute Cronbach's α and the first two principal components (to allow for positively and negatively phrased statements). The closer α is to 1, the better. And, we would also hope that the first two principal components cover a substantial amount of the variation in the data.

4.4 Results

In this section we present the results of the extensive surveys held amongst the three groups and we compare the scores on norms and values, on demographics and on actual behaviour regarding counterfeit products. We then discuss income levels in the three surveys, and we end with a set of questions regarding the prices of counterfeit products relative to original products.

4.4.1 Norms and values

Table 4-1 shows the mean scores of questions on norms and values. The numbers in parentheses are the numbers of

respondents who actually responded. In general the scores of individuals in group C are lower than those of group A and B. Cronbach's α is very close to 1, and also the first two principal components (PC1 and PC2 in the Table) explain close to 60% of the total variance.

When we compare the two groups with Surinamese individuals (A and B) we see that only for 4 out of 18 values, the results are significantly different, including G9 (National safety), G12 (Forgiveness) and G16 (Achievements). When we compare the control group C with A and B, we see that the Dutch in the Netherlands seem to significantly differ on no less than 14 and 13 scores, respectively. Hence, Table 4-1 shows that, in terms of general values, the Surinamese in Suriname and the Surinamese in the Netherlands are very similar as they closely share their norms and values.

Table 4- 1: Mean scores (with number of respondents in parentheses) for general values (Table A1).

5% significant differences across S-S and S-N are marked with [1], across S-S and N-N with [2] and across S-N and N-N with [3]

VALUES	SURINAMESE IN SURINAME (S-S)		SURINAMESE IN THE NETHERLANDS (S-N)		DUTCH IN THE NETHERLANDS (N-N) (N=200)
G1	6.66	(224)	6.73	(108)	6.43[2][3]
G2	6.29	(225)	6.44	(108)	6.05[2][3]
G3	6.71	(223)	6.71	(107)	6.16[2][3]
G4	6.34	(224)	6.21	(108)	5.76[2][3]
G5	6.50	(220)	6.43	(107)	5.89[2][3]
G6	6.53	(222)	6.39	(108)	5.90[2][3]
G7	6.08	(225)	6.09	(108)	5.94
G8	5.98	(222)	6.33[1]	(107)	6.14
G9	6.60	(224)	6.18[1]	(108)	5.91[2][3]
G10	6.33	(225)	6.47	(108)	6.23[3]
G11	5.91	(222)	5.90	(108)	5.54[2][3]
G12	6.20	(225)	5.82[1]	(106)	5.48[2][3]
G13	5.24	(221)	5.02	(106)	4.89[2]
G14	6.61	(225)	6.63	(106)	6.24[2][3]
G15	5.36	(225)	5.58	(106)	5.69[2]
G16	6.29	(225)	5.49[1]	(108)	4.61[2][3]
G17	6.28	(223)	6.11	(107)	6.12
G18	6.74	(224)	6.63	(108)	6.37[2][3]

	SURINAMESE IN SURINAME (S-S)	SURINAMESE IN THE NETHERLANDS (S-N)	DUTCH IN THE NETHERLANDS (N-N) (N=200)
Cronbach's α	0.911	0.951	0.912
% Variance explained by PC1	0.490	0.537	0.462
% Variance explained by PC2	0.080	0.087	0.104

Tables 4-2 and 4-3 are in the same format as Table 4-1. Table 4-2 shows the mean scores on the statements in Table A2 associating with norms and values concerning counterfeit products in general and relative to original products.

Now, Cronbach's α is much lower (as could somehow be expected), although still values in the range 0.6 to 0.8 are obtained. The first two principal components explain about 40 to 50% of the total variance, which does not seem very bad either.

It is interesting to see that there seems to be agreement amongst the Surinamese (A and B) on all values except for example for C2 ('for higher quality products one

does not always have to spend more money') and C6 ('If there would not be any counterfeit products, then many people could not purchase any products').

For group C we obtain yet another (higher) average value for C6, and also for C5 ('I usually purchase original products, even when the price of a counterfeit product is lower'), in which case the Dutch in the Netherlands agree more

For Table 4-2, the two groups of Surinamese individuals significantly differ on 3 of the 10 scores, and for Table 4-3 it is 4 out of 11. At the same time, differences across the Dutch and the Surinamese in Suriname and in the Netherlands are significant in 7 and 5 of the 10 cases in Table 4-2 and in 4-9 and 8 out of 11 cases in Table 4-3.

Table 4- 2: Mean scores (with number of respondents in parentheses) for values concerning counterfeit products relative to original products (Table A2).

5% significant differences across S-S and S-N are marked with [1], across S-S and N-N with [2] and across S-N and N-N with [3]

VALUES	SURINAMESE IN SURINAME (S-S)		SURINAMESE IN THE NETHERLANDS (S-N)		DUTCH IN THE NETHERLANDS (N-N) (N=200)
C1	5.00	(218)	4.51	(108) [1]	4.15[2,3]
C2	4.98	(214)	5.66	(109) [1]	5.22[3]
C3	4.27	(215)	3.96	(108)	3.66[2]
C4	3.59	(216)	3.28	(108)	3.34
C5	4.12	(216)	3.75	(108)	5.02[2,3]
C6	5.81	(215)	5.14	(109) [1]	3.85[2,3]
C7	4.21	(216)	4.15	(106)	4.29
C8	4.80	(216)	4.82	(107)	4.33[2,3]
C9	4.07	(217)	3.94	(109)	3.70[2]
C10	5.01	(215)	4.98	(109)	4.65[2]
Cronbach's α	0.749		0.664		0.681
% Variance explained by PC1	0.211		0.277		0.321
% Variance explained by PC2	0.188		0.230		0.262

Table 4- 3: Mean scores (with number of respondents in parentheses) for values concerning production and sales of counterfeit products (Table A3).

5% significant differences across S-S and S-N are marked with [1], across S-S and N-N with [2] and across S-N and N-N with [3]

VALUES	SURINAMESE IN SURINAME (S-S)		SURINAMESE IN THE NETHERLANDS (S-N)		DUTCH IN THE NETHERLANDS (N-N) (N=200)
P1	4.29	(214)	4.81	(109) [1]	3.75 [2] [3]
P2	4.55	(212)	4.32	(109)	4.56
P3	4.75	(213)	4.74	(109)	3.87 [2] [3]
P4	3.45	(213)	3.48	(108)	4.18 [2] [3]
P5	3.71	(208)	4.02	(109)	3.88
P6	4.39	(210)	4.44	(109)	3.84 [2] [3]
P7	4.91	(215)	5.24	(107)	4.14 [2] [3]
P8	3.24	(214)	4.07	(108) [1]	5.01 [2] [3]
P9	4.80	(212)	4.33	(108) [1]	3.87 [2] [3]
P10	5.08	(213)	4.77	(106)	4.32 [2] [3]
P11	5.62	(212)	4.04	(107) [1]	4.11 [2]
Cronbach's α	0.774		0.690		0.607
% Variance explained by PC1	0.250		0.283		0.349
% Variance explained by PC2	0.143		0.200		0.212

In sum we conclude that Surinamese individuals share cultural norms and values, whether they live in Suriname or in the Netherlands, and they are also distinctively different from Dutch individuals in our control group.

4.4.2   Demographics

Table 4-4 gives some summary statistics of the demographics. The main differences are the age distribution where Surinamese individuals in the Netherlands are much older on average than in Suriname, which corresponds with the fact that Suriname has a substantial amount of young citizens. Our sample in Suriname has a smaller fraction of Creoles and a larger fraction of mixed ethnicity. Furthermore, households in Suriname are substantially larger than in the Netherlands, where the Surinamese in the Netherlands have household sizes that come close to those of ethnic Dutch in the Netherlands.

The gender quotas amongst the Surinamese respondents (groups A and B) are a bit biased towards females, but this also indicates that the professional bureau that interviewed people in group C is of good quality (with

54% males). There are more creoles interviewed in group B relative to A and less people with mixed ethnicity.

When we further compare the columns with headers B and C, we see that various scores are rather similar across Surinamese individuals in the Netherlands and Dutch people in the Netherlands. The distributions of the number of adults in a household, the number of children in a household and the number of working adults in a household are broadly similar across the two samples. Also, the age distribution is rather similar, and all this suggests that Surinamese people in the Netherlands have similar demographics as Dutch people in the Netherlands have. These statistics seem to confirm the earlier statements that the Surinamese in the Netherlands did assimilate rather well since 1975-1980.

Table 4- 4: Demographics of respondents

(A = Surinamese in Suriname, B = Surinamese in the

Netherlands, and C = Dutch in the Netherlands (N=200) (with

numbers of respondents in parentheses)

VARIABLE	STATISTIC	A		B		C
Age	Mean	28.5	(211)	46.4	(109)	42.0
	Median	24		48		41
	Minimum	18		17		18
	Maximum	79		103		78
	Standard deviation	11.5		16.4		14.9
Gender	Fraction males	37.7%	(215)	38.5%	(109)	54.0%
Ethnic group	Creole	33.3%		60.0%		NA
	Hindu	13.3%		7.5%		NA
	Mixed	28.0%		15.8%		NA
Adults in Household	Mean	2.8	(209)	1.6	(106)	1.7
	Median	3		2		2
	Minimum	0		0		0
	Maximum	9		5		4
	Standard deviation	1.5		0.89		0.79

Table 4- 4: Demographics of respondents

VARIABLE	STATISTIC	A		B		C
	Mean	1.4	(190)	0.57	(99)	0.59
	Median	1		0		0
Children in	Minimum	0		0		0
Household	Maximum	8		3		3
	Standard deviation	1.4		0.87		0.86
	Mean	2.4	(210)	1.4	(106)	1.4
Working adults in household	Median	2		1		1
	Minimum	0		0		0
	Maximum	7		5		4
	Standard deviation	1.1		1.0		1.0

4.4.3   Purchases of counterfeits

A key table in our paper is Table 4-5. It shows the fractions of individuals who state that they have recently and consciously purchased a counterfeit product. Interestingly, the percentages 84% and 78% for Surinamese people in Suriname and in the Netherlands (A and B), respectively, are about the same. In striking contrast is the 50% score of Dutch people in the Netherlands.

Table 4- 5: Did you ever consciously purchase a counterfeit product? (The fraction of answers 'yes' to this question of the total number of respondents)

GROUP	PERCENTAGE
Surinamese in Suriname	83.7%
Surinamese in the Netherlands	77.4%
Dutch in the Netherlands	50.0%

Evaluating these scores against the impression we obtained from Tables 4-1 to 4-3, we are tempted to conclude that the similarity across norms and values for individuals in groups A and B also translates to actual behaviour. The Surinamese individuals share the same norms and values and they also consciously purchase counterfeit products with the same frequencies.

To first examine the effect of income, we fit binary probit models to the purchase data for individuals to see if there are any variables that can predict this binary variable. Table 4-6 reports on the probit models (1 = yes, I purchased a counterfeit product recently, and 0 = no, I did not). The models include the average scores on norms and values (from Tables 4-1, 4-2 and 4-3) and the demographics from Tables 4-4 and 4-7 (to be discussed below). In the models for Surinamese people we include variables for ethnicity,

and in the model for Surinamese in the Netherlands we add the number of years that people are in the Netherlands. In the model for Dutch people in the Netherlands we do not include these variables as we have no data on these. The p-values indicate the relevance of various sets of variables. All these p-values are way above 0.05, and hence suggest that the probability of purchasing counterfeit products does not depend on demographics, values, ethnic background, and not on how long people have already lived in the Netherlands. Hence, from Table 4-6 we can learn that income seems not to be a predictor for purchasing counterfeits.

Table 4- 6: P-values in probit models for individual purchases of counterfeit products

(yes = 1, no = 0) (A = Surinamese in Suriname, B = Surinamese in the Netherlands, and C = Dutch in the Netherlands)

(Sample size is given in Table 4-1)

SIGNIFICANCE OF VARIABLES	P- VALUES		
	A	B	C
All	0.333	0.362	0.373
Income, income^2	0.281	0.235	0.322
Creole, Hindu (Mixed)	0.498	0.420	
Years in the Netherlands, years ^2		0.974	

4.4.4 Is there a relation with income levels?

When we continue with a focus on the income levels across the three groups, Table 4-7 shows that the income distribution in Suriname is skewed to the left, with a large fraction of individuals that has less than 800 SRD (net) to spend per month, which is less than about 200 euro per month. The income distribution for the Dutch in the Netherlands reflects that of the general Dutch population, with an average annual income of 30000 euro (http://www.gemiddeld-inkomen.nl/modaal-inkomen.php), and as discussed before. Also, we notice a striking 18% of survey participants who refuse to indicate their income level.

Interestingly, our survey amongst Surinamese people in the Netherlands (B) shows that their income levels are rather high, also when compared to the Dutch in the same country. This might be due to some sample selection (when collecting our data for group B), where we had to rely on friends and relatives (of the second author) to collect the addresses of Surinamese people in the Netherlands. This may have led to an underreporting for poor Surinamese in the Netherlands. Note however, that even when the Surinamese have approximately 12 times as much to spend

(in terms of after tax Euros), they still agree with more than 77% that they consciously purchase counterfeit products.

Table 4- 7: Income distribution (A = Surinamese in Suriname, B = Surinamese in the Netherlands, and C = Dutch in the Netherlands)

GROUPS	INCOME CATEGORIES	FRACTION
A	< 800 SRD	55.3 %
	800 – 1200 SRD	17.5 %
	1200 – 2000 SRD	17.0 %
	2000 – 2800 SRD	4.4 %
	2800 – 4000 SRD	2.4 %
	> 4000 SRD	3.4 %
Average (Approximately): 1000 SRD ≈ 225 Euro		
B	< 400 Euro	0.0 %
	400 – 800 Euro	6.5 %
	800 – 1600 Euro	15.0 %
	1600 – 3200 Euro	43.0 %
	3200 – 4000 Euro	17.8 %
	> 4000 Euro	17.8 %
Average (Approximately): 2750 Euro		
C	< 400 Euro	13.5 %
	400 – 800 Euro	10.0 %
	800 – 1600 Euro	27.0 %
	1600 – 3200 Euro	26.5 %
	3200 – 4000 Euro	3.5 %
	> 4000 Euro	2.0 %
	Did not tell	17.5%
Average (Approximately): 1543 Euro		

Figures 4-1 and 4-2 are based on data from the World Bank, and there it can be seen that in terms of real GDP per capita in USD terms, the fraction is about 10. Hence, the income levels in our sample B are a bit too high, but not too far out from average officially published levels.

As a further comparison of income levels of the two groups of individuals, we can rely on the so-called Big Max index (not the menu, just the burger). In Suriname a Big Mac (September 2011) costs 11 SRD, which with an exchange rate (September 2011) of 4.45 SRD per Euro amounts to approximately 2.5 Euros. In the Netherlands (again September 2011) the price of a Big Mac is 3.25 Euros. This shows that the price levels in Suriname are also relatively higher.
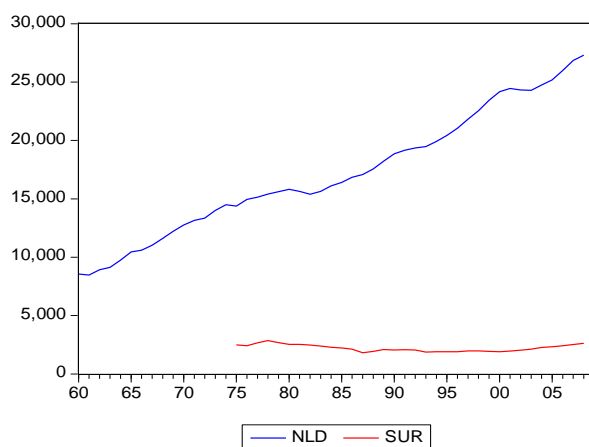
**Figure 4- 1: Per capita income in Suriname (SUR)
and the Netherlands (NLD) in USD (Source: World Bank) for
1975-2008 and 1960-2008, respectively**

SUR/NLD
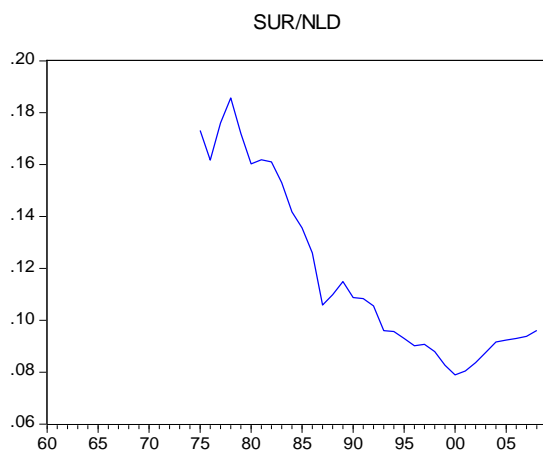
**Figure 4- 2: Ratio of GDP in USD of the Suriname over the
Netherlands**

In sum, we can conclude that Surinamese individuals in Suriname have significantly less money to spend (also in terms of PPP) than Surinamese people in the Netherlands, and also than Dutch people in the Netherlands.

However, the fact that Surinamese individuals in the Netherlands have more than 10 times as much to spend does not have an impact on their propensity to purchase counterfeit products. The percentages in Table 4-5, that is, 84% and 78%, show that income apparently is not the key driver of purchasing counterfeit products. As we have seen from Tables 4-1 to 4-3, the norms and values of Surinamese people in Suriname and in the Netherlands are very similar, and quite different in various dimensions from those of Dutch people in the Netherlands, we are now tempted to conclude that norms and values might be a more important driver to purchase counterfeits. Surinamese people, whether rich or poor, apparently do not see any problems with purchasing counterfeits.

4.4.5   Is there a relation with price levels?

Finally, we also asked the individuals in the three samples whether the price of the products would induce a higher personal probability of purchasing counterfeit products. We

mentioned 20 different types of products, and asked whether people would consider purchasing counterfeit versions of these products, given the price.

Table 4-8 gives the total scores of disagree and of agree, and hence omits the indifferent category. We see that there can be differences across those percentages, but also many similarities can be observed. Surinamese people disagree with the statements, on average, with fraction 58% and 56%, respectively, while the Dutch in the Netherlands disagree with 46%. On the other hand, the agree fractions of 21.31%, 24% and 21.73% for the three samples are broadly similar.

Table 4-8: Scores on questions 'Considering the price of the products, would you consider purchasing counterfeits?' Fully disagree is 1 and fully agree is 7.
The cells are the percentage disagree DAG) (scores 1, 2, and 3), and the percentage agree AG (scores 5, 6 and 7)
(A = Surinamese in Suriname, B = Surinamese in the Netherlands, and C = Dutch in the Netherlands)

Table 4- 8: Scores on questions 'Considering the price of the products, would you consider purchasing counterfeits?' Fully disagree is 1 and fully agree is 7.

The cells are the percentage disagree DAG) (scores 1, 2, and 3), and the percentage agree AG (scores 5, 6 and 7)

(A = Surinamese in Suriname, B = Surinamese in the Netherlands, and C = Dutch in the Netherlands)

PRODUCT	A		B		C	
	DAG	AG	DAG	AG	DAG	AG
Digital camera	74.76	10.95	77.57	10.28	2.50	13.00
Mobile phone	74.29	10.95	72.48	14.68	63.00	13.50
Clothing	31.78	39.25	33.94	43.12	29.00	37.00
Music CD	25.35	48.36	25.00	43.52	38.50	31.00
DVD movies	24.17	51.66	23.36	47.66	40.00	30.00
Shoes	51.66	23.22	52.78	25.00	44.50	26.00
Perfumes	68.42	12.44	62.96	21.30	47.50	24.00
Watches	57.21	16.35	50.94	24.53	42.50	24.50
Car parts	63.94	15.87	55.66	24.53	45.50	23.00
Jewellery	59.24	10.18	56.48	20.37	40.00	20.00
TV sets	72.60	12.98	74.07	11.11	59.50	10.50
Electric kitchen tools	72.95	22.56	64.81	11.96	49.00	19.00
Radios	67.31	13.46	63.89	15.74	46.00	16.50
Ironers	66.83	12.20	57.80	15.60	48.00	18.00
Books	23.56	43.75	44.44	36.11	41.00	23.00

Continued Table 4-8 Scores on questions 'Considering the price of the products, would you consider purchasing counterfeits?'

PRODUCT	A		B		C	
	DAG	AG	DAG	AG	DAG	AG
Body care products	66.35	15.87	64.49	20.56	42.50	25.00
Medicine (oral intake)	78.26	11.11	71.03	14.95	63.00	11.50
Medicine (other)	78.37	11.54	64.81	20.37	54.50	16.50
Food and beverage	70.05	14.01	57.01	27.16	40.50	22.50
Home appliances	37.98	29.33	40.74	31.48	31.50	30.00
Average	58.25	21.31	55.71	24.00	46.43	21.73

Tables 4-9 and 4-10 support these similarities even more, by showing that the mean differences in 'Agree' (bottom panel of Table 4-9) are small, while the differences in 'Disagree' are substantially larger.

The correlations in Table 4-10 further show that there is strong correlation across the 20 types of products, meaning that most interviewed individuals would consider similar products when purchasing counterfeit versions.

We interpret the results in Table4- 8 to 4-10 as that the price levels of counterfeit products are not a driver either.

Table 4- 9: Differences in preferences for purchasing counterfeit products

PEOPLE VERSUS PEOPLE	MEAN	MEDIAN	MINIMUM	MAXIMUM	STAN-DARD DEVIA-TION
DISAGREE					
Surinamese in Suriname - Surinamese in the Netherlands	2.54	2.31	-20.88	13.56	7.43
Surinamese in the Netherlands - Dutch in the Netherlands	9.29	9.98	-16.64	21.99	9.55
Surinamese in Suriname - Dutch in the Netherlands	11.83	14.99	-17.44	29.55	13.52
AGREE					
Surinamese in Suriname - Surinamese in the Netherlands	-2.69	-3.57	-13.15	10.60	6.21

Continued Table 4- 9: Differences in preferences for purchasing counterfeit products

PEOPLE VERSUS PEOPLE	MEAN	MEDIAN	MINIMUM	MAXIMUM	STAN-DARD DEVIA-TION
AGREE					
Surinamese in the Netherlands - Dutch in the Netherlands	2.28	0.90	-7.04	17.66	6.16
Surinamese in Suriname - Dutch in the Netherlands	-0.41	-2.61	-11.56	21.66	9.76

Table 4- 10: Correlations across preferences for purchasing counterfeit products (Table 4-11)

(A = Surinamese in Suriname, B = Surinamese in the Netherlands, and C = Dutch in the Netherlands)

	GROUPS	A	B	C
DISAGREE	A	1.00	0.93	0.74
	B		1.00	0.81
	C			1.00
AGREE	A	1.00	0.89	0.73
	B		1.00	0.87
	C			1.00

4.5   Conclusions and implications

In this final section we give the main conclusions of our study. Next, we discuss potential implications. Finally, we give suggestions for further research.

4.5.1   Conclusion

The population of Surinamese individuals, who live either in Suriname or in the Netherlands, provides a unique opportunity to test whether cultural norms and values could be one of the drivers of counterfeit purchases. We surveyed Surinamese people in both countries and held their answers to a range of questions against a control group of Dutch individuals in the Netherlands. The use of two additional groups (that is, individuals from the same background in another country and individuals with other origins) has so far not been done in the relevant literature. We showed that Surinamese people in the Netherlands have assimilated rather well in the Netherlands, with similar sized families, similar age distributions, and, most importantly, similar disposable income levels. At the same time, their norms and values are broadly the same as the people in Suriname itself. And, saliently, their attitudes towards purchasing counterfeit

products and even their factual purchasing behaviour are also broadly similar. This leads us to conclude that purchasing counterfeit products seems to be associated more with cultural norms than with income levels and prices.

4.5.2   Implications

This conclusion has various implications. When international organizations or government agencies intend to reduce the traffic and trade of illegal counterfeits in developing countries, there seems more to be done than just equalizing prices of products and trying to raise income standards (in developing countries).

Apparently, campaigns to create awareness seem useful, as cultural aspects are important too. Hence, as a means to positively influence the perception and ultimately the behaviour of the target group, it is essential that the cultural values of the target group are taken into account in the war against counterfeits. Consequently, this suggests that the process to achieve the desired perception, attitude and behaviour towards counterfeits must be customized by taking into consideration the cultural values of the target group. And, this also implies that the time we need to

incorporate to change the current practice may perhaps take much longer than expected, as influencing or changing cultural norms and values is much more time-consuming than trying to change prices.

4.5.3 Further research

The collection of the relevant data is quite involved, and needs quite some attention from the researchers. As we are personally familiar with people in Suriname and the Netherlands, our choice for these two countries originated out of convenience. Further work in this area could address other large groups of individuals who live in their home country and somewhere abroad (in reasonably large amounts, so that cultural norms and values are kept as if they would still live in the home country). One could think of Chinese people living in Australia or Turkish people living in Berlin.

When studying alternative samples of data, it is important that one corrects for the potential possibility that answers are given out of social desirability. This could have happened for our Dutch individuals, but we were not able to properly observe this. Finally, one may hold against our study that it is merely a quasi-experiment which may

address cultural differences across Surinamese and Dutch individuals, but perhaps we should better have looked at culture-based differences across the Surinamese within Suriname themselves. This can be done by priming subjects with different cultural information and then measure their answers to relevant questions. We aim to pursue this in our further work.

Chapter 5

Consumers' attitudes towards SFFC medicines: Evidence for a developing country

Abstract

We examine the awareness of Surinamese individuals concerning the purchase of SFFC medicines and their attention for SFFC medicines when they purchase (obtain) their medication, as well as their attitudes towards SFFC medication. If one would want to change behaviour, it is important to have insights into consumer perceptions, attitude, alertness and awareness. We also assess whether and to what extent consumers are suspicious of having received SFFC medicines (on doctor's prescription) through the official distribution channel (that is, pharmacies). Next, we study how health risks, confidence in the official channel and product information correlate with consumer

suspicion and alertness when obtaining medicines through the official channel and their use of SFFC medication. We finally address how these aforementioned factors in particular, among other factors, associate with consumers' (conscious) past purchases of SFFC medication.

5.1   Introduction

Spurious or falsely-labelled or falsified or counterfeit (labelled as SFFC) medicines are medicines that are deliberately and fraudulently mislabelled with respect to identity and/or source (World Health Organization, WHO, 2012). SFFC medicines (often referred to as counterfeit drugs) come in many variations (Kelesidis, et al. 2007). WHO (2012) reported that worldwide SFFC medicines impose all sort of risks to public health, sometimes even resulting in the death of patients. Given the fact that counterfeiters are good at what they do, licensed distributors, pharmacists, healthcare providers and patients are often unable to detect SFFC products. In addition, it is difficult to differentiate between SFFC and genuine medical products due to a lack of resources and skills (International Medical Products Anti-Counterfeiting Taskforce, IMPACT n.d.-a).

Other shortcomings mentioned by IMPACT (n.d.-a) are weak regulatory and enforcement systems or even the absence thereof, the different definitions of counterfeit medical products in different countries worldwide, and the variation in distribution systems.

5.1.1 Some figures

Over the years, almost every type of good has been counterfeited (and/or pirated), and the numbers are believed to further increase (OECD 2007b; Dixon and Greenhalgh 2002). Various sources report estimates that at least 10% of the pharmaceutical trade worldwide consists of SFFC medicines. In May 2012 the WHO reported a rate of occurrence of less than 1% of market value of SFFC medicines in industrialized countries with effective regulatory systems and market control (that is, Australia, Canada, Japan, New Zealand, the United States of America, and most of the European Union). These figures may be considered as extremely low (WHO 2012).

Counterfeiting is however expected to be most prominent in regions where regulatory and enforcement systems for medicines are weakest, that is, in most countries with developing or least developed economies (WHO 2012).

Most of these countries also lack the infrastructure and financial resources which are necessary to take measures against the influx and distribution of counterfeits in their country (Kelesidis, et al. 2007). As a result, WHO (2012) proposed that in many African countries, and in parts of Asia, Latin America, and countries in transition, a much higher percentage of the medicines on sale would be SFFC medicines. According to the estimates of IMPACT, which is a partnership comprised of all the major anti-counterfeiting players (international organizations, non-governmental organisations, enforcement agencies, pharmaceutical manufacturers' associations and drug and regulatory authorities), which was launched in February 2006 by the WHO as a response to the growing public health crisis of counterfeit drugs (IMPACT n.d.-b), the share of SFFC medicines in many countries in Africa and parts of Asia and Latin America is believed to be more than 30% of the medicines on sale (IMPACT 2008). IMPACT (2008) also reported that in many of the countries of the former Soviet Union the proportion of SFFC medicines is estimated to be above 20% of market value. Moreover, for medicines purchased via the internet from illegal sites that conceal their physical address, the estimate is that in over 50% of cases these medicines are SFFCs.

Addressing the South American country Suriname, research by Franses and Lede (2010) on the diffusion process of counterfeit (SFFC) and original medical products in Suriname provided estimates on the scale of counterfeits as part of the total amount of various medical product types shipped to this country. Based on the available shipments figures of Suriname's main harbour in Paramaribo, from 1996- 2008 (provided by the General Bureau of Statistics of Suriname, GBS), Franses and Lede estimated that the shipments of counterfeit medical products will eventually account for about 40% of total shipments of medical products to Suriname. Using these shipment figures we can estimate that for 1996-2008 the number of SFFC medical products, as part of the total shipment of medical products to Suriname was about 33% (see Appendix 1). Given that no drastic policy changes in Suriname have occurred, we expect that the total share of SFCC medical products in Suriname is in between 30% and 40% of all medical products. This number seems in line with the IMPACT estimates for similar countries.

5.1.2 Our current study

The phenomenon of counterfeiting may be investigated from the supply side, which is the side of the producers and distributors of the SFFC medicines, and from the demand side, which is the side of the consumers of the illicit medicines. In our study below, the phenomenon is approached from the demand side. We use this angle because we will be able to collect data on individual consumers, which is rather new to the literature. We study the deceived (unknowing and thus unwilling) consumers of SFFC medicines (usually called the primary market, Scorpecci 2009), and the non-deceived (knowing and thus willing) consumers (the secondary market). Both types of consumers can suffer negative effects, varying from lower consumer utility of a good to imposed health and safety risks (Dixon & Greenhalgh 2002), and therefore they are both relevant for our study.

In this study we will examine how aware Surinamese individuals were when purchasing medication in the past, how their current attention for SFFC medicines is when they purchase (obtain) their medication, as well as their attitudes towards SFFC medication. If one would want to change their behaviour, then it is of course important to

have insights into consumer perceptions, attitude, alertness and awareness. We want to assess whether and to what extent consumers are suspicious of having received SFFC medicines (on doctor's prescription) through the official distribution channel (that is: pharmacies), and how health risks, confidence in the official channel and several factors with regard to product information correlate with consumer suspicion and alertness when obtaining medicines through the official channel and their use of SFFC medication. In addition we address how these aforementioned factors, among other factors, associate with consumers' (conscious) past purchases of SFFC medication.

5.1.3   Main results

The main findings of this study, based on an extensive survey amongst Surinamese individuals, are that having more product information for original medication leads to a smaller probability of purchasing a SFFC medication. At the same time, a higher degree of suspicion also leads to a higher probability of such a purchase, hence there seems to be a demand for SFFC medicines. In addition, more 'Product information for medication' and more 'Confidence in the quality of the distribution channel' are found to lead

to lesser suspicion of having received an SFFC through an official channel. Finally, people who are confident that they can learn whether the medicine is original based on the product information are found to be more alert when obtaining medication.

The outline of our paper is as follows. First, we briefly describe the public health policy in Suriname with regard to the fight against SFFC medicines. Then, we discuss some aspects of the relevant literature considering factors that affect the non-deceptive purchase of counterfeit goods by a consumer. Next, we discuss the data collection, the survey questions that were used, the methodology and the data analysis. We then turn to the results, and finally conclude with a discussion and the main implications from our study.

5.2. Background

5.2.1 Health care in Suriname

Suriname is a country with a developing economy, which has a population of approximately 534,000 inhabitants (GBS 2013). It is estimated that more than 60% of the Surinamese population is below international poverty levels,

while there also is a non-negligible group of multi-millionaires in this country. Although average welfare has been reported to be on the rise, the income inequalities in Suriname are quite large (Franses and Lede 2012).

As is the case in countries all over the world, in Suriname the main responsibility concerning public health lies in the hands of the Surinamese government. Its Ministry of Health (MOH) is the government agency in Suriname which is responsible for ensuring the quality of health care and the formulation of pharmaceutical policy, including monitoring its quality. There is a National Medicines Policy 2004-2008 (NMP), which depicts the policy of the MOH with respect to the supply of medicines in Suriname. Important aspects of the NMP include ensuring the availability and accessibility of the selected essential medicines for the entire population, strengthening regulation bodies, and establishing a national quality control laboratory (Ministry of Health 2005, p.12). With regard to the quality control of medicines the MOH reported that it has arranged and monitored the efficacy and safety of the drugs regulation in Suriname in accordance with the WHO recommendations (HERA 2010, p.28; Ministry of Health 2011).

In order to safeguard the quality control, the MOH has regulation bodies (Registration Authority, Pharmaceutical Inspection) in place. Furthermore, the MOH reports to work closely with other regulatory and enforcement institutions such as the Inspection of Customs and Excise, the departments of the Ministry of Trade and Industry and the Police Corps of Suriname. The MOH has partnerships with the professional association of Pharmacists in order to determine the Surinamese Pharmacy Standard as a guide for self-regulation and other matters relating to the profession and service. Also, MOH partners with other countries in their region, with which it exchanges information about the quality of imported medicines as well as with producers to detect any wrongdoing (Ministry of Health 2011).

In summary, the MOH (2011) reports that the quality of drugs which enter Suriname through official channels (particularly pharmacies) and which are distributed in this country can be deemed as good, due to the fact that (1) all of these drugs are recorded in the register of packaged drugs, (2) all of these drugs are subjected to a quality control, and (3) in the entire distribution and sales channels these drugs are under the supervision of qualified pharmacists.

In spite of the abovementioned claims on the part of the MOH, one of the leading newspapers in Suriname reported in 2011 that no less than 85% of total sales in the legal circuit in the country concerned fake (SFFC) medicines (newspaper De Ware Tijd 17 September 2011, p.1). This figure was adopted from an investigation on the prevalence of fake (SFFC) medicines in Suriname, which was reported to have been done by a private investigation agency on behalf of Pfizer (one of the largest pharmaceutical companies in the world). Despite the issued press release in their defence suggesting that the claim was incorrect and that there was no such evidence, the MOH (2011) to date seemed to fail to present solid documentation to underpin their arguments.

An investigation regarding the strengthening of the pharmaceutical quality assurance and legislation (from 2008-2010), which was commissioned by the MOH and which was done by Research For Action (HERA), shed light on some key concerns (HERA 2010, p.3, 13-14). These are that, although quality is central in the formulated NMP and even though this policy was prepared in accordance with the WHO recommendations on how to develop and implement a national drug policy and which was approved by the Government of Suriname in 2005, the

applicable laws and regulations in the field of medicinal products are still obsolete. The current legislation appears not complete and relies on the Medicines Act dating from 1896.

Also, while the MOH is able to guaranty the quality of the drugs that are formally admitted and legally imported, the quality of all other drugs outside these official processes cannot be guaranteed. It was also reported that there is little control on processes in the informal market. There is also a lack of routine sampling on the market, and the only quality control laboratory in Suriname is that of the Drug Supply Company Suriname (DSCS) ("Bureau Geneesmiddelen Voorziening Suriname"). This laboratory occasionally performs tests at the request of the Pharmaceutical Inspection, even though the DSCS laboratory has limited capacity and seemed to have performed without professional guidance for years. Furthermore, DSCS itself is one of the largest importers of drugs in Suriname and therefore may not be seen as an independent institute. So, although the MOH attached importance to establishing a national quality control laboratory in Suriname (as stated in the NMP), to date there is no independent quality control laboratory for drugs in the country.

In addition, even though the MOH has several partnerships, there is insufficient professional consultation between the authorities concerning registration, inspection, pharmacovigilance (drug safety), the MOH and Council for the Essential Medicines Program ("Raad voor het Essentieel Geneesmiddelenprogramma"), and as a result the regulatory system cannot guarantee the quality of all drugs on the market. There is also no structural exchange of information between countries with stringent medicine regulatory systems in order to optimize the system. Also, the database of registered medicines is not accessible online, it is also inadequately automated, it is only accessible for professionals, and the applications that the professionals submit are only processed by hand.

Hence, taking all the above together, it seems that the Surinamese government has a long way to go before they will be able to ensure that the quality of drugs on the Surinamese market meets the requirements set by the WHO (that is, in the formal system, and also reducing the size of the informal system). Therefore, the Surinamese government should not only study the current situation on the number of SFFC medical products available in Suriname, as well as the deficiencies in the system which lead to this situation, it also should attack the identified

problems effectively with well structured, rigorous and consistent policies.

To initiate such a progress, below we will report on the first ever detailed survey amongst Surinamese individuals on their use of SFFC medicines. Our findings can be helpful to fight SFFC medication use.

5.2.2 More details

With regard to the availability of medicines in Suriname it is the case that some medicines are only available in pharmacies on a doctor's prescription, while other medications can be purchased without such a doctor's prescription, in either a pharmacy, a drugstore or sometimes even in shops and supermarkets. Concerning the medicines that are available to the Surinamese people, it is their health insurance company (or insurer, which could be the government again) that determines which medicines (the variety, the amounts, the brands and therefore the quality of medicines) pharmacies can provide to the clients on doctor's prescription. Although health insurance companies have to comply with the NMP, each health insurance company (insurer) has its own medicines register containing

those medicines of which the cost are reimbursed by them, provided that these medicines are prescribed by a doctor.

Regarding the coverage of medical costs of the people in Suriname, the Pan American Health Organization (2010, p. 6) reported that the medical costs of approximately 34% of the Surinamese population are covered by private health insurance, company plans, or pay out-of-pocket. The State Health Insurance Fund (SHI) ("Stichting Staatsziekenfonds") covers the medical costs of 26% of the Surinamese population. The majority of individuals who are insured by this health insurance company are employees of the Surinamese government, who are obliged to purchase their health insurance from this health insurer. The Ministry of Social Affairs and Housing (MSAH) covers the medical costs of 31% of the Surinamese population, who are coined as the under-privileged. The medical costs of the remaining 8% of the Surinamese population are covered by the Foundation Medical Mission Primary Health Care Suriname (FMM) ("Stichting Medische Zending Primary Health Care Suriname"), which is a private, non-profit, primary health care organization which focuses on communities in the interior part of the country and which is subsidized by the MOH for a great part.

5.2.3   Theoretical framework

According to Kelesidis et al. (2007) there are counterfeit drugs in circulation that do not contain any of the active (pharmaceutical) ingredients. Some of the counterfeit drugs contain the active ingredients, but then in harmful amounts, and other counterfeit drugs even contain at least one completely different active ingredient. Kelesidis et al. (2007) also state that there are counterfeit drugs that contain preparations which come from an unacceptable source. Further, some counterfeit drugs contain packaging where the product's true expiration date is falsified. Also, some counterfeit drugs contain preparations which are either differently formulated than the original drugs or which contain unacceptably high levels of impurities or even impurities such as mould.   These authors documented furthermore that in developing countries many of the purchased drugs without packaging are counterfeit.

Lamphone et al. (2004) document that when a patient was cured due to the use of a medicine and if that medicine was more expensive than other medicines of its sort, that then the quality of this medicine was perceived as good or likely to be good. Also, very often the drug sellers perceived that a good quality medicine was one with a label

and expiry date. Moreover, the consumers in this study of Lamphone et al. (2004) often trusted the pharmacy services, drug companies, physicians and drug regulatory authorities to provide them with good quality medicine to such an extent that they did not worry about the quality of the drugs they obtained.

Given that SFFC medicines come in many variations (Kelesidis et al. 2007) it is important that consumers not only know about the existence of counterfeit drugs, but that they are also able to distinguish SFFC medicines from originals and how to do so, at least in those cases where this is possible. In the battle against counterfeiting, consumer awareness is already shown to very important (Gautam et al. 2009). Hence, the extent to which consumers are alert and aware with regard to SFFC medicines must be assessed in particular if one wishes to increase consumer alertness and awareness. Alertness is the state of mind that enables an intuition or spontaneous learning (Kizner cited in Aviram, 2010). According to Aviram (2010), awareness is the transformation of alertness into a resource. Awareness can be created or improved upon, whereas this is not possible for alertness (Aviram 2010). Thus, even though some consumers may already be alerted, and hence already may be alert (watchful or cautious) when

obtaining their medicines, it is of great importance that alertness is triggered for people and that they are made fully aware of not only the scale but also the impact of illicit medicines. In order to do this it is particularly important that proper information on this matter is made widely available to all consumers and all other stakeholders.

In order to successfully launch a social marketing campaign as a means to influence a target audience, the behaviour, the preferences, and factors influencing the behaviour and preferences of the target audience must first be assessed and understood (Cheng et al. 2009, p. 20). There have been several studies on the various factors and drivers affecting the non-deceptive purchase of counterfeit goods by a consumer. Summarizing these studies, Eisend and Schuchert-Güler (2006) devise a classification, namely the factors that are related to (1) the situation, (2) the product (product attributes like quality, price and scarcity), (3) the person (demographic and psychographic variables), and (4) the broader cultural context (cultural and social influences).

With regard to the financial aspect (price and income) concerning the conscious purchase of counterfeit goods, it is reported, irrespective of the type of product, that consumers balance monetary expenditures against the

perceived benefits (O'Shaughnessy 1987). Although some studies on the relationship between income and the purchase of counterfeit goods have shown no correlation between the purchase (intention) of different counterfeit products and the socioeconomic status (measured on the basis of income) (Kwong et al. 2003 and Casola 2007), other studies have shown a (negative) correlation between income and an attitude towards counterfeiting (Wee et al. 1995, Tom et al. 1998 and Ang et al. 2001). Although non-price determinants are found to influence a consumer's intention to purchase counterfeits, the magnitude of this influence differs per type of counterfeit product (Wee et al. 1995).

Concerning the conscious purchase of counterfeit goods, research by de Matos et al. (2007) has shown that consumers who had previously purchased counterfeits non-deceptively (thus consciously), had a more favourable attitude towards counterfeits than those who had never willingly purchased a counterfeit. Also, the extent to which a consumer perceives certain attributes to be present in a product is believed to influence the purchase decision (Wee et al. 1995).

According to Connor, Homer and Kahle (cited in Fritzsche & Oz 2007), values are the foundation for the development of attitudes, and these attitudes result in

specific decision-making behaviour. Rokeach (Cited in Fritzsche & Oz 2007) defined a value as 'an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end state of existence'. Parsons (cited in Swidler, 1986) documented that culture affects human actions by directing a person's actions to some ends rather than others. Franses and Lede (2012) reported that cultural norms are indeed a key driver for the purchases of counterfeit products. Culture can be described as the support for and opposition to different ways of life, the shared values legitimating social relations, and therefore the generator of diverse preferences (Wildavsky 1987).

Concerning risk, WHO (2012) reported that SFFC medicines impose all sort of risks to public health, sometimes even resulting in the death of patients. Risk is found not only to play a significant role in the purchase of counterfeits (Albers-Millers, 1991), it is also found that perceived risk was the most important variable to predict consumers' attitudes towards counterfeits (de Matos et al. 2007).

According to Olander and Thorgesen (cited in Casola 2007) a consumer's environment and circumstances are better predictors of his behaviour than personal

characteristics. The purchase situation can be described as the conditions under which a consumer purchases goods (Eisend and Schuchert-Güler 2006). Casola (2007) also reported that consumers are more accepting towards black markets as long as they are driven by their needs.

Taking into account the aforementioned theories and the situation in Suriname, we provide a conceptual model, in which we present the investigated relationships between variables. In general we propose that the assumed knowledge that consumers have with regard to original and SFFC medicines and their confidence in the official distribution channel influence their alertness when obtaining medicines. Also, these factors have an impact on their suspicion of having received an SFFC medicine through the official channels in the past, and ultimately, these factors influence consumer purchase of SFFC medicines.
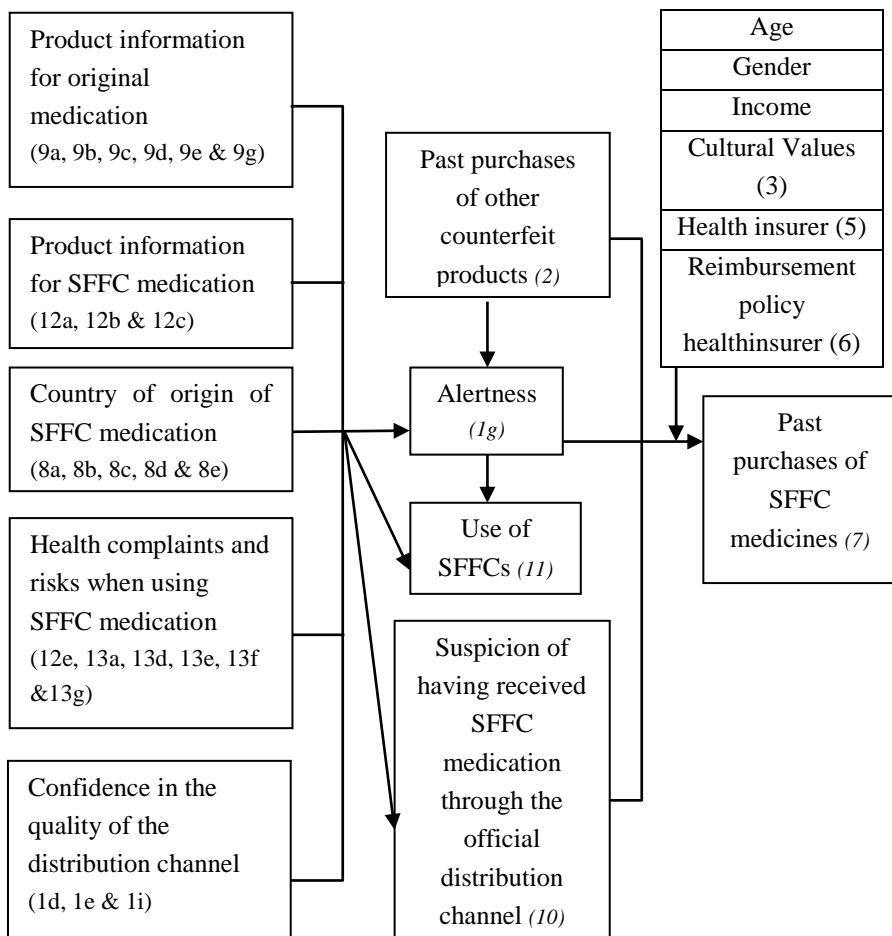
Figure 5- 1: The conceptual model

(In the brackets are shown the statements/questions in the

questionnaire which were used to measure the variables)

To address these issues we carefully collected a new database by interviewing a large and representative amount of individuals in Suriname.

5.3 Data collection and methodology

5.3.1 Data collection

In order to select the sample from the population of Surinamese people from the age of 18 and living in Paramaribo we employed a multistage cluster sampling technique. The General Bureau of Statistics of Suriname (GBS) drew 30 clusters in Paramaribo (the capital city of Suriname) from which 20 households were selected.

Every cluster had a pointer address providing the interviewers the first household where a respondent should be interviewed. The 19 remaining households in every cluster were selected by using a specific method. This method entails that the total of prospective 600 respondents from the 30 clusters (each with 20 households) were selected using the 'birthday rule'.

Data collection lasted about six weeks in February and March 2013 and the survey response rate was 52%, which amounts to 311 respondents. Most of the 298 prospective respondents who did not cooperate either refused to participate, of whom, interestingly enough, the majority of these respondents were people living in elite neighbourhoods, or they were not available for an interview even after repeated visits by the interviewers. It might be that the survey response is influenced by the fact that there have been several survey studies on other topics prior to this study, particularly in Paramaribo. Consequently, various prospective respondents had the impression that they were approached to partake in a study in which they had already participated. The majority of these respondents did not even give the interviewers the opportunity for further explanation.

The questionnaire (see Appendix B for a shortened version of the questionnaire where mainly the questions are presented that will be used in our analysis below) contains about 100 questions and statements with pre-coded answer categories. The full Dutch language version of the questionnaire is available from the author upon request.

5.3.2 Methodology

To summarize the variables in each of the five blocks on the left-hand size of Figure 5-1, we use Principal Component Analysis (PCA). Our (unreported) findings suggest the first principal component for each of these 5 sets over items covers most of the variance. At the same time, the weights in this first component resemble a simple average of the items, and hence we pursue as follows.

These 5 variables which will be treated as explanatory variables in our analysis are

V1: 'Product information for original medication'. This score is the average of answers to the questions 9a, 9b, 9c, 9d, 9e and 9g. A higher score means that an individual is confident that based on the product information he or she can learn whether the medication is original.

V2: 'Product information for SFFC medication'. This score is the average of the answers to the questions 12a, 12b and 12c. A higher score means that an individual is confident that based on the product information he or she can learn whether the medication is an SFFC.

V3: 'Country of origin of SFFC medication. This score is the average of the answers to the questions 8a, 8b, 8c, 8d and 8e. A higher score means that an individual is confident that based on information on the country of origin he or she can learn whether the medicine is an SFFC.

V4: 'Health complaints and risks when using SFFC medication'. This score is the average of the answers to the questions 12e, 13a, 13d, 13e, 13f and 13g. A higher score means that an individual is aware that SFFC medications are harmful.

V5: Confidence in the quality of the distribution channel. This score is the average of the answers to the questions 1d, 1e and 1i. A higher score means that an individual believes that original medications are sold by official pharmacies.

In our analysis we also use as explanatory variables:

Age: measured in years

Gender: 1 is male, 0 is female

Income: coded as 1, 2, 3, 4, 5, and 6 (similar to the answers)

Cultural values: the average of the scores on the answers to questions 3a to 3r.

Insurance 1: a dummy with value 1 if answer is 5.1, 0 otherwise

Insurance 2: a dummy with value 1 if answer is 5.2, 0 otherwise

Insurance 3: a dummy with value 1 if answer is 5.3, 0 otherwise

Reimbursement: coded as 1, 2, 3, 4, 5, or 6, according to the answers to question 6.

Past purchases of counterfeit products, general: 5 dummy variables Past1, Past2, Past3, Past4 and Past5 associated with the answers to question 2.

All subsequent estimates are obtained using EViews. For our analyses we use the standard linear regression model, the ordered probit model and the binomial logit model.

5.4   Results

5.4.1   Descriptive analysis

Some of the questions and statements contain missing values due to the fact that not all questions and statements were answered by all the respondents.

A total of 311 respondents participated in this survey, of which 58% were females and 42% were males.

40% of all respondents had a monthly income with a maximum of SRD800 (approximately Euro183 or USD 246). The monthly income for the 2 subsequent categories (between SRD800 and SRD1200 and between SRD1201 and SRD2000) was about 25% for each category. Only 11% of all respondents had a monthly income of at least SRD 2001 (approximately Euro616 or USD470). (See Figure 5-2) Even though in general not more than 40% of the respondents had a monthly income of SRD800 or less, among those who are subsidized by the government this number was 64%.
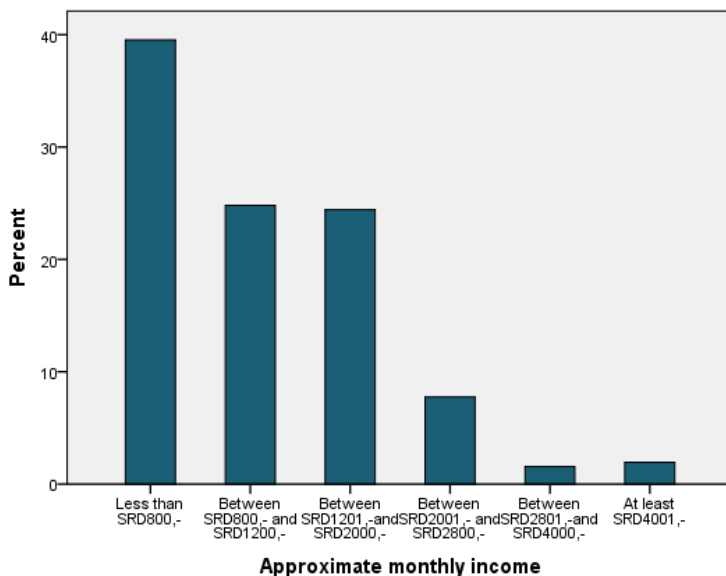
Figure 5- 2: Income distribution

Irrespective of whether the costs of their health insurance were co-paid or fully paid by the employer (a distinction which is further ignored), 69% of all the participating respondents had some kind of health insurance. Among the remaining 31% of the respondents, only 8% was fully uninsured and paid their medical bill themselves (out-of-pocket). The other 23% of this group of respondents was either subsidized by the government through MSAH or through FMM. (See Figure 5-3)
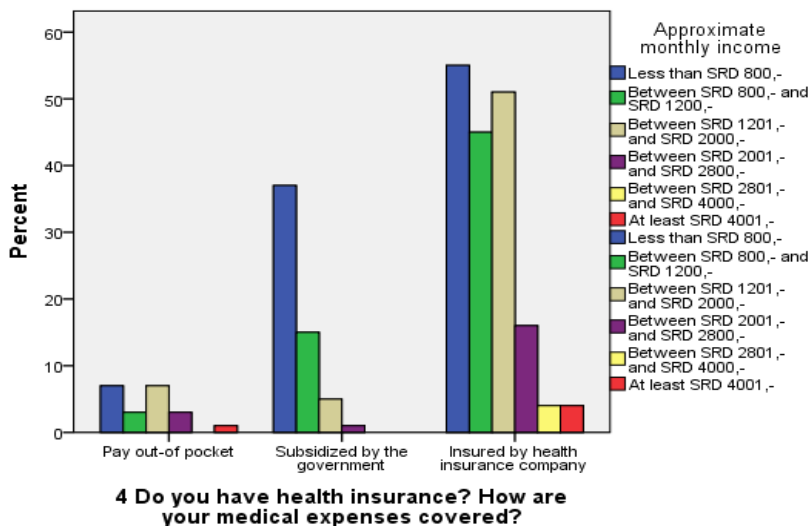
Figure 5- 3: Respondents categorized based on their approximate monthly income and how he/she covered her/his medical expenses

Based on the Pearson's chi-square this association between the approximate monthly income and how medical expenses are covered was found to be significant, χ^2 (10) = 29.093, p = 0.001.

Among those respondents who paid for their health insurance (the insured who either paid their health insurance themselves or whose employer co-paid or fully paid the health insurance, a distinction which is also further ignored

in this investigation), 77% of them were insured by the SHIF, 22% were insured by a private health insurance company, and just 1% of all insured respondents were insured by both SHIF and a private health insurance company.

In our following analyses the respondents with a SHIF health insurance as well as one by a private insurance company are categorized under those who are insured by a private insurance company, as this group accounts for only 1% of all respondents. This is because these insurances are often perceived as being more favourable than those of SHIF, which is because private insurance companies often offer more elaborate insurance packages.

With regard to the respondents who are insured, only 36% indicated to have always had all the costs for medications reimbursed (Figure 5-4). In this category, those who are only insured by a private health insurance company (not the SHIF) represent the majority (62%). Just 27% of the respondents who were only insured by SHIF indicated to have always had all the costs for medications reimbursed.
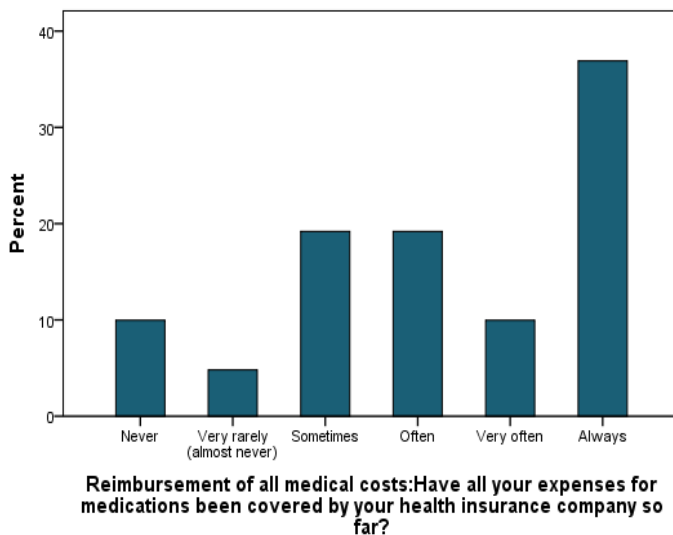
Figure 5- 4: The number of times that respondents their insurer (e.g. insurance company) reimbursed all the medical expenses

Figure 5-5 shows that irrespective of how the medical expenses of the respondents are covered, about 80% of them indicate to have never suspected in the past that they obtained medication from a pharmacy, thus through the official channel, (on doctor's prescription) that could have been an SFFC medication.
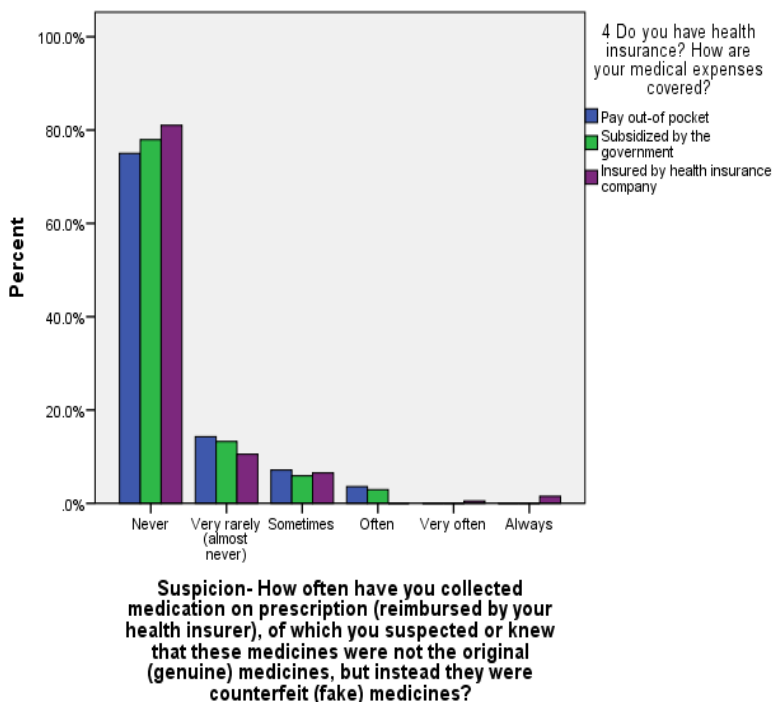
Figure 5- 5: Respondents categorized based on how their
medical expenses are paid and their suspicion of having
received an SFFC through the official channel

Only 26% of the respondents who suspected to have
obtained SFFC medication via the official channel did not
use these (supposed SFFC) medication. Almost one third of
all respondents (27%) used these supposed SFFC

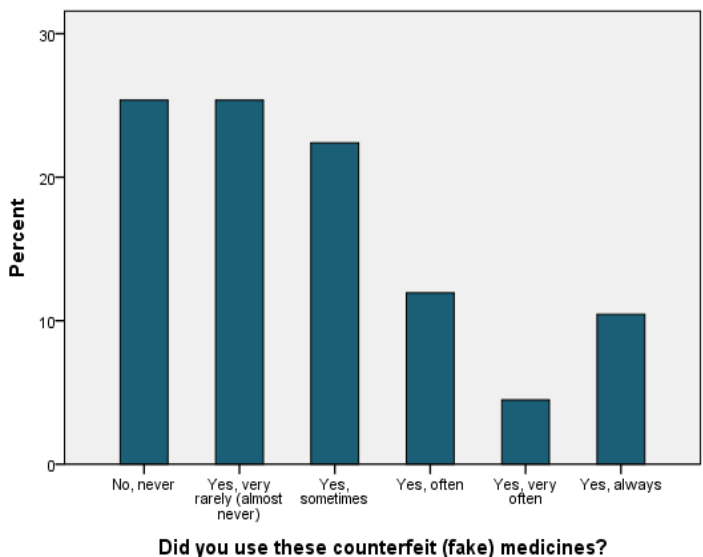medications often or more frequently after obtaining them. (See figure 5-6)

Figure 5- 6: Respondents their usage of the (supposed) SFFC medication they received through the official channel

Finally, while 71% of all respondents indicated to have never consciously purchased SFFC medications, only 27% of all respondents indicated that they had never consciously purchased other sorts of counterfeit goods in the past (See Figure 5-7 and 5-8).

Based on the Pearson's chi-square this association between the (conscious) purchase other sorts of counterfeit goods in the past and the (conscious) purchase of SFFC medications was found to be significant, χ^2 (16) = 65.255, p = 0.000.
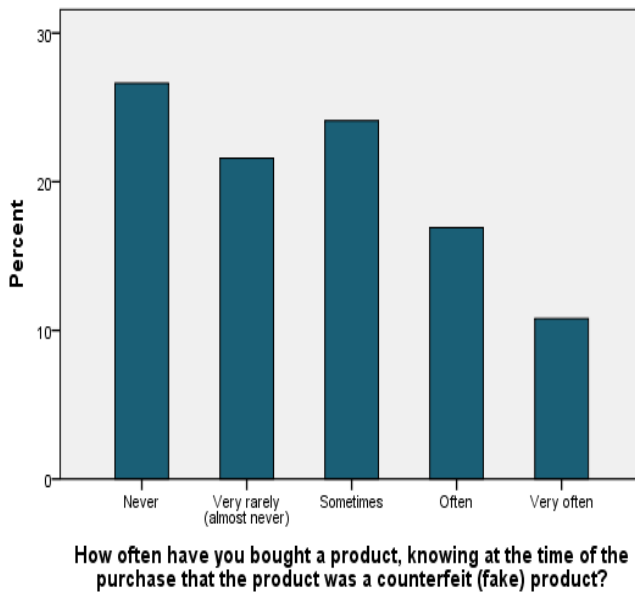

Figure 5- 7: Respondents conscious past purchases of SFFC medication (left) and (other) counterfeit products (right)
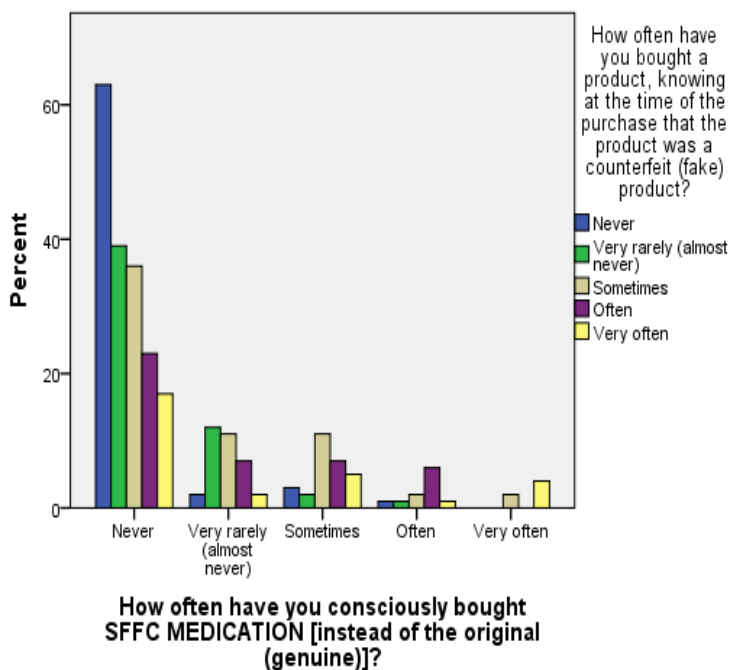
Figure 5- 8: Respondents categorized based on their conscious past purchases of SFFC medication and (other) counterfeit products

5.4.2 The models for the variables to be explained and the results

First, we create a model for Alertness. This variable is coded as 1, 2, 3, 4, 5 (question 1g), it is treated as a continuous variable, and the associated model is a standard linear regression model. The first general model that we estimate includes an intercept, V1 to V5 and Past1 to Past5. The R-squared of this model is 0.079, estimated for 236 observations (all missing cases are excluded), and the p value for the overall F test is 0.041. Deleting one by one the variables with the lowest associated p values reduces the model to including only the intercept and V1, where this last variable obtains an estimate of 0.211 with estimated standard error 0.079. In words, this outcome suggests that people who are confident that based on the product information they can learn whether the medication is original are also more alert when obtaining medicines.

Next, we create a model for the use of SFFCs. The relevant question is question (12), and it is answered by only 67 individuals who did *not* say 'never' to question (11). The coding is 1, 2, 3, 4, 5, and 6, and as there is an ordering of the answers, we rely on ordered probit model, where the

included variables are V1 to V5. Due to missing data, the parameters of this model can only be estimated for 53 observations. The Pseudo R-squared is 0.015 and the p value for the Likelihood Ratio test for the joint relevance of all variables is 0.766. This suggests that there are no relevant explanatory variables here.

Our third model, see Figure 5-1, concerns the suspicion of having received an SFFC through the official channel. This variable follows from question (11), where we code the answers 2 through 6 as 2 through 6. Answer 1 is not included. The resulting variable is an ordered variable, for which we have 49 observations, so again we use an ordered probit model, where the explanatory variables are V1 to V5. The overall Pseudo R-squared is 0.179, and the p value for the Likelihood Ratio test for the joint relevance of all variables is 0.004. Hence, this model does some explanatory value. After deleting insignificant terms, the remaining two variables that are significant are V2 and V5, with parameters (and standard errors) equal to -0.480 (0.217) and -0.765 (0.253). In words this means that more 'Confidence that one can decide on the basis of product information that a product is an SFFC' and more 'Confidence in the quality

of the distribution channel' lead to lesser suspicion of having received an SFFC through an official channel.

Finally, we construct a model for the actual purchases of SFFC medicines. For this we rely on question 7, where we code the answers 1 and 6 as 0 and 2 to 5 as 1. Hence, a 1 means that an individual has consciously purchased a counterfeit medicine. In the first round model we include all explanatory variables as mentioned above, including the demographics and the values. Subsequent deletion of insignificant parameters, leads to a final model (estimated for 289 observations), which contains two explanatory variables (except the intercept). The McFadden R-squared is 0.062, and the p value for the Likelihood Ratio test for the joint relevance of all variables is 0.000, and so we have confidence in this estimated model. V1 obtains a parameter estimate of -0.477 (0.165) and the variable 'Suspicion of having purchased a SFFC medication' has an estimate of 0.703 (0.189). This means that having more product information for original medication leads to a smaller probability of purchasing a SFFC medication and at the same time a higher degree of suspicion also leads to a higher probability of such a purchase. The latter result seems to suggest that once people suspect that they are

about to obtain SFFC medication through the official channel, they do not stop purchasing these counterfeit medicines.

5.5   Conclusion and implications

5.5.1   Conclusion

The analysis in this paper concerned whether and to what extent consumers are suspicious of having received SFFC medicines (on doctor's prescription) through the official distribution channel (that is: pharmacies), and how health risks, confidence in the official channel and several factors with regard to product information correlate with consumer suspicion, alertness when obtaining medicines through the official channel and their use of SFFC medication. We also addressed how these aforementioned factors in particular, including the past purchase of other counterfeit products, associate with consumers' (conscious) past purchases of SFFC medication.

According to the results there was a significant association between consumers' conscious past purchases of other sorts of counterfeits and conscious past purchases of SFFC medicines. While almost one in every three respondents

indicated to have consciously purchased at least one SFFC medicine in the past (in accordance with the estimates in Appendix A), at least one in every seven respondents purchased some sort of counterfeit good in the past. Hence, there seems to be a tendency of appreciating counterfeit products in general amongst a substantial amount of people. We thus propose a further investigation of the extent to which consumers perceive medicines and other sorts of counterfeits goods as similar. In addition, further investigation can identify (more extensively) not only the risks that consumers believe SFFC medicines and counterfeit goods entail, but also the extent to which the perceived risks are common for SFFC medication and other sorts of counterfeit goods. This will reveal more (specific) information which can be used in a series of awareness campaigns, where the health risks of SFFC medicines should be accentuated.

In addition, although we found that consumer alertness when obtaining medications was not significantly associated with the conscious past purchases of SFFC medications, the results showed that people who are confident that based on the product information they can learn whether the medication is original are more alert when obtaining their medicines.

As the product information for original and SFFC medication may be similar in some cases, we emphasize the need to inform consumers about the matter of SFFC medications in Suriname, including how to recognize these illicit medicines in particular by greatly accentuating the quality difference between original and SFFC medications. Additionally, we stress the relevance of enabling people to recognize these SFFC medicines in those instances where this is possible. In addition, we find it very important that the potential negative health consequences of these illicit medications are emphasized in awareness campaigns, as a means to increase alertness, create (more) awareness, and hence to influence attitudes with regard to this matter. Consequently, consumers who have consciously purchased medication can be motivated to change this undesired behaviour.

Furthermore, we found that the more a medicine can be identified as SFFC medication based on the available product information and the more the confidence of consumers in the quality of the distribution channel (the doctors, pharmacies, and drugstores) the lesser the suspicion of having received an SFFC through an official channel.

Considering these findings that consumers tend to be less suspicious of ever having obtained SFFC medication

from the official channel as they are more confident in the distribution channel, in light of the (current) inadequate state of quality control of medicines (including in the official distribution channel) in most developing countries, and taking into account that consumer identification of a medicine is mostly based on shortcomings with regard to the product information, we emphasize the need for (more and better) consumer education with regard to identifying SFFC medicines. As consumers seem to be less critical when obtaining medication as their trust in the official distribution channel increases, it is also good to bear in mind that actions of the official distribution channel (pharmacies and doctors) are not independent of the consumers their respective health insurer (in particular their reimbursement policies and their medicine register). Therefore, trusting that the prescription medicines by a doctor which are obtained from a pharmacy are original may be misleading as the role of the health insurer, who insurer determines the brands which are available to his clients, might be overlooked. Hence, educating and therefore enabling consumers to identify SFFC medicines is very important. Given these findings, the government and other relevant stakeholders must also take the necessary measures to truly ensure (or at least make it more likely that)

consumers' health is not jeopardized by the SFFC medications (obtained in Suriname, especially via the official distribution channels).

The results also showed that consumer suspicion of having received SFFC medications (on prescription) through the official distribution channel in the past was positively correlated with his past purchases of SFFC medications. Therefore, we suggest further investigation on this matter as this result seems to suggest that once people suspect that they are about to obtain SFFC medication through the official channel, they do not stop purchasing these counterfeit medicines. We therefore strongly insist that further investigation is done on the reasons why consumers suspected to have received SFFC medications through the official channel and the extent to which these suspicions are legitimate. We believe that further investigation is essential to discover the precise perceptions which consumers hold concerning the relevant stakeholders with regard to this matter, the legitimacy of consumer suspension, and the reasons why they suspect to have obtained SFFC medication through the official distribution channel. This information will enable government and other relevant stakeholders to take the necessary measures to reduce

consumer suspicion, and hence the conscious purchase of SFFC medication.

Finally, we found that past purchases of SFFC medications was also found to be negatively correlated with having more product information for original medications. This once more indicates that proper education of consumers will decrease the probability that they will consciously purchase SFFC medication.

5.5.2 Implications

Given our results we recommend that the control (and regulation) with regard to the market of medical products, thus not only in the official distribution channel, is increased and tightened. Most certainly, the control in the official distribution channel for medical products must be intensified. Doing so and increasingly communicating this to consumers can result in a decrease in the number conscious purchases of SFFC medications by suspicious consumers, particularly those who have unfounded suspicions with regard to official distribution channels.

As our findings indicate that consumers, who had more confidence in the official distribution channels also, had a lower degree of suspicion concerning having received

SFFC medications in the past, we found our results to be in line with Lamphone et al. (2004). Hence, as consumers' trust in the official distribution channels is not found to associate with their alertness, nor with other factors, except for the product information of original products, and given that the product information for original and SFFC medication may be similar in some cases, we believe that increasing the control in (at least) the official distribution channel is inevitable. This is because consumers do not sufficiently seem to know to distinguish originals from SFFCs and therefore seem to assume that original medicines all have certain product information and that all medicines which are obtained through the official distribution channels are reliable.

Although we found an association between consumer suspicion of having received SFFC medications (on doctor's prescription) in the past with conscious past purchases of SFFC medications, in contrast to our expectations, we did not find any association between alertness when obtaining medications with conscious past purchases of SFFC medications nor between alertness and suspicion of having received SFFC medications on (doctor's prescription) in the past. Furthermore, despite our expectations that consumers their use of the alleged SFFC

medication would correlate with their alertness and the factors with regard to the product information, these correlations were found to be not significant.

Regarding consumer alertness, we only found a significant correlation with the product information for original products. As alertness precedes awareness (Aviram 2010), consumers must first be made alert in order for them to become aware. We therefore deem it important that consumers are made alert concerning the existence of SFFC medications on the Surinamese market, the characteristics of these medicines, and the (health) risks that these medications impose on consumers. Consumers can only then be watchful when they know the extent to which they are exposed to SFFC medications, the variety of counterfeit techniques used to make SFFC medicines and the results thereof (the characteristics of SFFC medicines). Consequently, we expect that combining this knowledge concerning the scale of SFFC medications on the Surinamese market, the (potential) difference in quality and characteristics of SFFC and original medications, and the potential risks of these illicit medications, with the knowledge to determine the originality of a medication (in those instances where possible) will eventually improve consumer awareness and may change undesired behaviour

with regard to the matter of SFFC medicines. We therefore recommend that further investigation is done to learn which other factors correlate with (or even better: influence) consumer alertness, awareness, and attitude with the aim to influence consumer behaviour more towards the desired direction, which is full awareness and hence the reduction (and were possible: elimination) of the conscious purchases and use of SFFC medication.

Appendixes of chapter 5

Appendix A

The data concerning import of original and counterfeit products to Suriname (in kilograms) from 1996- 2008

Based on the following numbers of the GBS, the average import rate for counterfeit medical products from 1996-2008 is estimated to be about 33%.

Table A1: Pharmaceutical items, general (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
1996	6984.57	2437.43	9422	25.9
1997	6726.67	2404.33	9131	26.3
1998	52109.53	19346.47	71456	27.1
1999	79784.1	29644.9	109429	27.1
2000	102338.1	40856.93	143195.03	28.5
2001	22542.07	8584.93	31127	27.6
2002	75868.91	20278.09	96147	21.1
2003	12747.33	5462.67	18210	30.0
2004	12117.31	7397.69	19515	37.9
2005	8025.62	2938.38	10964	26.8
2006	8639.09	3554.91	12194	29.2
2007	15909.47	6238.53	22148	28.2
2008	15565.72	10033.28	25599	39.2
			AVERAGE	28.8

Table A2: Medicine, for sale small scale (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
1996	7140.12	3402.88	10543.0	32.3
1997	3721.98	1606.02	5328.0	30.1
1998	1631.59	673.41	2305.0	29.2
1999	2360.47	818.53	3179.0	25.7
2000	25662.14	9946.86	35609.0	27.9
2001	55775.76	16261.24	72037.0	22.6
2002	27512.91	9549.09	37062.0	25.8
2003	22004.05	7445.95	29450.0	25.3
2004	16083.69	6314.31	22398.0	28.2
2005	30502.89	17907.11	48410.0	37.0
2006	43727.94	24332.06	68060.0	35.8
2007	120884.8	164090.2	284975.0	57.6
2008	56326.23	32061.77	88388.0	36.3
			AVERAGE	31.8

Table A3: Medicine, not for sale small scale (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
1996	82410.42	34027.58	116438.0	29.2
1997	126437.3	53107.74	179545.0	29.6
1998	87937.55	42676.45	130614.0	32.7
1999	66519.33	45686.67	112206.0	40.7
2000	129504.3	70367.69	199872.0	35.2
2001	91668.09	48919.91	140588.0	34.8
2002	88133.77	42033.23	130167.0	32.3
2003	237083.1	105841.9	342925.0	30.9
2004	176400.2	101030.8	277431.0	36.4
2005	413139.4	479416.6	892556.0	53.7

Continued Table A3: Medicine, not for sale small scale (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
2006	284124.9	200984.2	485109.1	41.4
2007	278071.7	127044.3	405116.0	31.4
2008	302822.2	141556.8	444379.0	31.9
			AVERAGE	35.4

Table A4: Wound covering materials (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
1996	21680.89	11375.11	33056	34.4
1997	25731.19	26771.81	52503	51.0
1998	18485.6	8128.4	26614	30.5
1999	10025.28	6677.72	16703	40.0
2000	23374.1	10868.9	34243	31.7
2001	28716.47	17209.53	45926	37.5
2002	20663.89	14954.11	35618	42.0
2003	45351.56	23804.44	69156	34.4
2004	48713.34	23512.66	72226	32.6
2005	33667	16122	49789	32.4
2006	44422.59	22254.41	66677	33.4
2007	33909	21029	54938	38.3
2008	52893	38540	91433	42.2
			AVERAGE	36.9

Table A5: Blood items (in kilograms)

YEAR	ORIGINAL	COUNTERFEIT	TOTAL	% COUNTERFEIT
1996	1007.85	364.15	1372	26.5
1997	12778.71	11796.29	24575	48.0
1998	6391.8	2106.2	8498	24.8
1999	2160.36	838.64	2999	28.0
2000	3251.14	1259.86	4511	27.9
2001	3112.78	1131.22	4244	26.7
2002	731.46	370.54	1102	33.6
2003	5704.68	3990.32	9695	41.2
2004	16571.03	6558.97	23130	28.4
2005	8564.73	3352.27	11917	28.1
2006	1759.19	777.81	2537	30.7
2007	2634.27	1126.73	3761	30.0
2008	45435.9	17764.1	63200	28.1
			AVERAGE	30.9

(Franses and Lede, 2010)

Appendix B

The shortened version of the questionnaire

1) **For each statement, please give the answer that is closest to your own opinion.**

1 - Strongly disagree   4 - Agree

2 - Disagree   5 - Strongly agree

3 - Not disagree and

   disagree

STATEMENTS Give your opinion on each statement by checking a response option.	1	2	3	4	5
_d._ Very often, the medicines sold in pharmacies are original (genuine).	☐	☐	☐	☐	☐
_e._ Very often, the medicines which are sold in a drugstore are original (genuine). (*Certain medications can be bought without prescription in a drugstore.)	☐	☐	☐	☐	☐
_i._ If I get a medication from the doctor (on prescription), then I know this medicine, is an original (genuine) medicine.	☐	☐	☐	☐	☐

2) **How often have you bought a product, knowing at the time of the purchase that the product was a counterfeit (fake) product?** *It does not matter which product it was.* **(*Read on the front page what a counterfeit product is.)**

☐ 1	Never	☐ 4	Often
☐ 2	Very rarely (almost never)	☐ 5	Very often
☐ 3	Sometimes	☐ 6	I do not know. I cannot remember.

3) **Read the following statements and indicate how important you find the following.**

1 - Very unimportant

2 - Not unimportant

3 - Not unimportant and not important

4 - Important

5 - Very important

VALUES Give your opinion on each statement by checking a response option.	1	2	3	4	5
a. Happiness (contentedness)	☐	☐	☐	☐	☐
b. True friendship (close companionship	☐	☐	☐	☐	☐
c. Self-respect (self-esteem)	☐	☐	☐	☐	☐
d. A world at peace (free of war and conflict)	☐	☐	☐	☐	☐

Continued VALUES (3) Give your opinion on each statement by checking a response option.	1	2	3	4	5
e. Equality (brotherhood, equal opportunity for all)	☐	☐	☐	☐	☐
f. Wisdom (a mature understanding of life)	☐	☐	☐	☐	☐
g. A comfortable life (a prosperous life)	☐	☐	☐	☐	☐
h. Pleasure (an enjoyable, leisurely life)	☐	☐	☐	☐	☐
i. National security (protection from attack)	☐	☐	☐	☐	☐
j. Freedom (independence, free choice)	☐	☐	☐	☐	☐
k. Social recognition (respect, admiration)	☐	☐	☐	☐	☐
l. Salvation (saved, eternal life)	☐	☐	☐	☐	☐
m. An exciting life (a stimulated, active life)	☐	☐	☐	☐	☐
n. Inner harmony (freedom from inner conflict)	☐	☐	☐	☐	☐
o. A world of beauty (beauty of nature and the arts)	☐	☐	☐	☐	☐
p. A sense of accomplishment (lasting contribution)	☐	☐	☐	☐	☐
q. Mature love (sexual and spiritual intimacy)	☐	☐	☐	☐	☐
r. Family security (taking care of loved ones)	☐	☐	☐	☐	☐

4) **Do you have health insurance? How are your medical expenses covered?**

☐ 1	I do not have health insurance, so every time I go to the doctor, I pay the bill myself. (*Continue with question 7).
☐ 2	My medical expenses are paid by the Ministry of Social Affairs (Onvermogenkaart of Minvermogenkaart). (*Go to question 6)
☐ 3	My medical expenses are paid by the Medical Mission (Medische zending). (*Go to question 6)
☐ 4	I have chosen a health insurance company and insured me there.
☐ 5	The only insurance I have is through someone else (for example via a partner, parent, or guardian, etc.).
☐ 6	The only insurance I have is through my employer.
☐ 7	I am insured through my employer and I am also insured via someone else (for example, through a partner, or a parent or a caregiver, etc.).
☐ 8	I am insured through my employer and I also assured by another health insurer.
☐ 9	Other, namely....

5) By which health insurance company are you insured?

☐ 1	State Health Insurance Fund (SHIF)	☐ a	Voluntarily insured
		☐ b	Compulsory insurance
		☐ c	Privately insured
☐ 2	Insured by a (1) private health insurance (not SHIF)		
☐ 3	(Compulsory) insured by the State Health Insurance (SHIF) AND I'm also insured by a private insurer.		
☐ 4	Other, namely....		

6) Have all your expenses for medications been covered by your health insurance company so far?

(You get your medication on prescription and you do not have to pay out of pocket.)

☐ 1	Never	☐ 4	Often
☐ 2	Very rarely (almost never)	☐ 5	Very often
☐ 3	Sometimes	☐ 6	Always

7) How often have you bought counterfeit (fake) MEDICATION [instead of the original (genuine)] knowing at the time of purchase that this medicine was a COUNTERFEIT MEDICINE?

☐ 1	Never (*Continue with question 11)*	☐ 4	Often
☐ 2	Very rarely (almost never)	☐ 5	Very often
☐ 3	Sometimes	☐ 6	I do not know. I cannot remember.

8) In what case do you think that a medicine is counterfeit (fake)?

1 - Strongly disagree

2 - Disagree

3 - Not disagree and disagree

4 – Agree

5 - Strongly agree

6- I don't know.

STATEMENTS Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
a. A drug is usually counterfeited, if it does not come from Europe.	☐	☐	☐	☐	☐	☐
b. A drug is usually counterfeited, if it does not come from the USA.	☐	☐	☐	☐	☐	☐
c. Medicines from China are mostly counterfeited.	☐	☐	☐	☐	☐	☐

Continued STATEMENTS (8) Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
d. Medicines from India are usually counterfeited.	☐	☐	☐	☐	☐	☐
e. Medicines from unknown countries are usually counterfeited.	☐	☐	☐	☐	☐	☐

9) **For each statement, please give the answer closest to your own opinion.**

STATEMENTS Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
a. In case of original (genuine) medicines you can always read where the medication is made (e.g.: in which country).	☐	☐	☐	☐	☐	☐
b. In case of original (genuine) medicines you can always read that what the medication is made of (thus the composition).	☐	☐	☐	☐	☐	☐
c. In case of original (genuine) medicines you can always read what side effects the medication may have.	☐	☐	☐	☐	☐	☐
d. Original (genuine) medications are always in a neat package.	☐	☐	☐	☐	☐	☐

Continued STATEMENTS (9) Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
e. Original (genuine) medicines always have a brand name (So except for the medicine name, there is also a brand name on the medication or on its packaging).	☐	☐	☐	☐	☐	☐
g. Original (genuine) medicines usually work better than counterfeit (fake) medicines.	☐	☐	☐	☐	☐	☐

10) How often have you collected medication <u>on prescription</u> (reimbursed by your health insurer), of which you suspected or knew that these medicines were not the original (genuine) medicines, but instead they were counterfeit (fake) medicines?

☐ 1	Never (**Continue with question 21)*	☐ 4	Often
☐ 2	Very rarely (almost never)	☐ 5	Very often
☐ 3	Sometimes	☐ 6	Always

11) Did you use these counterfeit (fake) medicines? (see question 10)

☐ 1	No, *never*	☐ 4	Yes, *often*
☐ 2	Yes, *Very rarely (almost never)*	☐ 5	Yes, *very often*
☐ 3	Yes, *sometimes*	☐ 6	Yes, *always*

12) For each statement, please give the answer closest to your own opinion.

1 - Strongly disagree   **4 - Agree**

2 - Disagree   **5 - Strongly agree**

3- Not disagree and disagree   **6- I do not know.**

STATEMENTS Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
a. In case of counterfeit (fake) medication, it is usually is not listed where the medicine is made (e.g.: in which country).	☐	☐	☐	☐	☐	☐
b. In case of counterfeit (fake) medication, it is usually not listed of which substances the medicine is made (thus the composition).	☐	☐	☐	☐	☐	☐

Continued STATEMENTS (12) Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
c. In case of counterfeit (fake) medication, it is usually not listed which side-effects the medicine may have (thus: diseases that the medicine may cause).	☐	☐	☐	☐	☐	☐
e. Most counterfeit (fake) medicines do not make you better, but they also do not make you sicker. These drugs do nothing at all.	☐	☐	☐	☐	☐	☐

13) For each statement, please give the answer closest to your own opinion.

1 - Strongly disagree

2 - Disagree

3- Not disagree and disagree

4 - Agree

5 - Strongly agree

6- I do not know.

STATEMENTS Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
a. Counterfeit (fake) medicines are usually bad for one's health.	☐	☐	☐	☐	☐	☐

Continued STATEMENTS (13) Give your opinion on each statement by checking a response option.	1	2	3	4	5	6
d. If I use a medication and I do not get better, then I know that this medicine is a counterfeit (fake) medicine.	☐	☐	☐	☐	☐	☐
e. Only after I used a medicine, can I notice whether it is counterfeit (fake) or original (genuine).	☐	☐	☐	☐	☐	☐
f. All counterfeit (fake) medicines may kill you.	☐	☐	☐	☐	☐	☐
g. All counterfeit (fake) medicines make you sicker instead of making you better.	☐	☐	☐	☐	☐	☐

GENERAL QUESTION

3. How much is your monthly income approximately?			
☐ 1	Less than SRD 800, -	☐ 4	Between SRD 2.001, - and SRD 2.800, -
☐ 2	Between SRD 801, - and SRD 1.200, -	☐ 5	Between SRD 2.801, - and SRD 4.000, -
☐ 3	Between SRD 1.201, - and SRD 2.000, -	☐ 6	At least SRD 4.001,

Chapter 6

Towards a campaign to reduce the use of counterfeit (SFFC) medicine

Abstract

There is much evidence that threatening health messages are often not effective, and one may expect this to hold for warnings against the use of counterfeit medicine. We analyse this finding for the case of the South American country of Suriname, where the use of counterfeit (labelled as SFFC) medical drugs is substantial. This paper proposes two different claims that could be used in a campaign. The first claim contains a threatening message, while the second alludes to national pride. We find that the response to the claims does not differ across people who use or do not use counterfeit medication. At the same time, the threatening appears most effective and it is also best understood.

6.1   Introduction

The market for counterfeit (or better: SFFC, spurious, falsely-labelled, falsified, counterfeit) medical drugs is large. In various countries such drugs are produced, and in even more countries are these products consumed. Although such counterfeit drugs are used in developed countries like the USA and various European countries, it is common knowledge that most such counterfeits are used in developing countries. The World Health Organization WHO has estimated that in the latter countries no less than 30% of the medical products are counterfeit products. Franses and Lede (2010) estimated that this percentage can be as close to 40% for the South-American country of Suriname. Traffic of counterfeit medication could run via local small-scale pharmacies, but the recent rise of internet use also in developing countries and the advent of online pharmacies has also increased counterfeit drugs use, see for example Orizio et al. (2010).

The literature of the production and use of counterfeit products is large and scattered. One aspect of this literature concerns the motivations of individuals to willingly purchase and use such products. For medical products the relevant literature is not so large, as far as we

know, and the WHO reports and various other sources seem to suggest that potential drivers are lower prices, convenience and availability, habits and also ignorance. For Suriname, an extensive survey carried out in Lede and Franses (2013), similar drivers were found.

Assuming that governments of developing countries like Suriname would want to reduce the use of counterfeit medical drugs, it seems that the number of instruments is not large. Income levels of the poorer part of the citizens are perhaps not easy to change. Price levels may also be difficult to control, as typically the market for counterfeit products is not a very open and transparent market. One could think of instruments involving insurance policies, as suggested by Lede and Franses (2013) but one could also think of active campaigns to make people aware and to try to make them change their habits. It is the last potential instrument that is addressed in this paper.

Awareness campaigns to reduce potentially harmful behaviour are far from easy to design. On the one hand, threatening health messages seem not very effective, also as the Protection Motivation Theory (Rogers, 1975) predicts that individual responses to such messages could downplay the effect of such messages, or even worse, turn out to produce a counterproductive effect, see for example

ten Hoor, et al. (2012) and Cismaru et al. (2009). However, on the other hand, Clow and Baack (2007, p.172) documented that fear-inspiring messages correspond well with goods and services that eliminate problems or threats to the consumers' sense of personal security. They additionally report that the strength of the appeal (low-moderate-high level) should be powerful enough to get the attention of the target audience and to influence their thinking, yet not so fearful that the target audience avoids the message. In this paper we will examine if a negative effect also prevails in a potential campaign in Suriname.

In what follows we will examine the usefulness of two claims against the use of counterfeit medical drugs. One claim amounts to a threatening message and the other claim alludes to national pride. The first is:

'Do not buy counterfeits medicines: You will bring harm to your children and loved ones',

while the second is:

'A proud citizen of Suriname does not buy counterfeit medicines'.

In Section 2, we test the appreciation for these claims, amongst individuals who admit to use counterfeit medication versus those do state not to use such drugs. Our main finding is that the responses to the claims do not differ across people who use or do not use counterfeit medication. At the same time, the threatening message appears most effective and it is also best understood. We are thus tempted to conclude in Section 3 that the threatening message is worth to try in a real-life setting.

6.2   Testing the claims

In March 2013 we collected data on the use of counterfeit medications, and the results are reported in Lede and Franses (2013). Additional to the various questions on these counterfeits, we also showed people the two claims above and each time we asked 5 questions about these claims. In this section we discuss the results, which concern 311 individuals in Suriname. In Lede and Franses (2013) it is shown that, again, these 311 individuals provide an accurate representation of the people in Suriname.

We showed the claim, and then we provide 5 statements with which the respondents could fully disagree, disagree, be indifferent, agree, or fully agree. The 5 statements are 'The text of this message scares me', 'I do not like this message', 'I get the impression that the government wants to exercise control over me', 'The message is very clear to me and I believe it', and 'This message makes me want to change my behaviour'. The first claim has a threatening content, and hence based on the available literature, we thus expect that this claim could be less liked and may scare people (statements 1 and 2) and that also it may be less effective (statement 5).

Table 6- 1: Responses to the claim: 'Do not buy counterfeit medicines: you will bring harm to your children and loved ones'

FRACTION OF RESPONSE	FULLY DISAGREE	DISAGREE	INDIFFERENT	AGREE	FULLY AGREE
This message scares me.	17.9	34.7	10.4	28.9	8.1
I do not like this message.	24.8	49.2	11.7	12.1	2.3
I get the impression that the government wants to exercise control over me.	26.1	51.4	10.1	7.5	2.3
The message is very clear to me and I believe it.	1.3	3.9	7.2	58.6	29.0
Because of this message I intend to be more careful not using counterfeit medication.	1.3	1.3	2.9	56.0	38.4

Table 6-1 shows the responses to the first claim. The responses to the first three statements show quite favourable reactions, and also the overwhelmingly

216

positive outcomes on the last two statements suggest that the claim serves its purposes.

Table 6- 2: Responses to the claim 'A proud citizen of Suriname does not buy counterfeit medicines'

FRACTION OF RESPONSE	FULLY DISAGREE	DISAGREE	INDIFFERENT	AGREE	FULLY AGREE
This message scares me.	26.9	38.0	11.1	21.3	2.6
I do not like this message.	23.8	43.0	13.7	16.6	2.9
I get the impression that the government wants to exercise control over me.	22.9	54.2	13.1	7.2	2.6
The message is very clear to me and I believe it.	2.6	9.5	10.5	52.3	25.2
Because of this message I intend to be more careful not using counterfeit medication.	1.3	5.9	7.2	53.6	32.0

Similar numbers as in Table 6-1 appear in Table 6-2, where the claim about the proud citizen scares people even less but where the other scores are rather similar as for the first claim.

Table 6- 3: Reponses to claim: 'Do not buy counterfeit medication: you will hurt your children and beloved ones' against the use of counterfeit medication

CLAIMS		USE OF COUNTERFEIT MEDICATION			
		NEVER	RARELY	SOMETIMES	OFTEN
This message scares me.	DISAGREE	111	18	19	10
	AGREE	72	18	7	5
Chi-square test statistic is 3.623 (exact two sided p-value is 0.310)					
I do not like this message.	DISAGREE	52	22	22	14
	AGREE	31	4	5	1
Chi-square test statistic is 1.186 (exact two sided p-value is 0.797)					
I get the impression that the government wants to exercise control over me.	DISAGREE	163	27	22	14
	AGREE	23	3	3	1
Chi-square test statistic is 0.533 (exact two sided p-value is 0.933)					
The message is very clear to me and I believe it.	DISAGREE	11	1	1	1
	AGREE	177	32	25	14
Chi-square test statistic is 0.546 (exact two sided p-value is 0.958)					

Continued Table 6- 3: Reponses to claim: 'Do not buy counterfeit medication: you will hurt your children and beloved ones' against the use of counterfeit medication

CLAIMS		USE OF COUNTERFEIT MEDICATION			
		NEVER	RARELY	SOMETIMES	OFTEN
Because of this message I intend to be more careful not using counterfeit medication.	AGREE	5	1	2	0
	DISAGREE	188	35	26	17
Chi-square test statistic is 2.349 (exact two sided p-value is 0.427)					

In the survey in Lede and Franses (2013), we also asked people whether they consciously use counterfeit medicines, and we now hold these answers against the answers on the claims. Table 6-3 summarizes the results for each of the 5 statements on claim 1, when these are held against the answers 'never', 'rarely', 'sometimes' and 'often' concerning the use of counterfeit medication. The conclusion from the numbers in Table 6-3 is rather straightforward, and that is that there are no significant differences. Hence, there is no link between the use of such medication and the appreciation of the first claim.

Table 6- 4: Reponses to claim: 'A proud Surinamese citizen does not buy counterfeit medication' against the use of counterfeit medication

CLAIMS		USE OF COUNTERFEIT MEDICATION			
		NEVER	RARELY	SOMETIMES	OFTEN
This message scares me.	DISAGREE	131	21	20	12
	AGREE	50	10	4	3
Chi-square test statistic is 2.147 (exact two sided p-value is 0.542)					
I do not like this message.	DISAGREE	135	22	19	13
	AGREE	37	7	6	3
Chi-square test statistic is 0.257 (exact two sided p-value is 0.949)					
I get the impression that the government wants to exercise control over me.	DISAGREE	158	24	21	16
	AGREE	22	4	2	1
Chi-square test statistic is 1.055 (exact two sided p-value is 0.813)					
The message is very clear to me and I believe it.	DISAGREE	28	3	2	1
	AGREE	156	28	21	15
Chi-square test statistic is 2.039 (exact two sided p-value is 0.587)					
Because of this message I intend to be more careful not using counterfeit medication.	DISAGREE	16	1	2	1
	AGREE	170	31	23	16
Chi-square test statistic is 1.239 (exact two sided p-value is 0.774)					

Similar results for the second claim are presented in Table 6-4. Users of counterfeit medication do not provide different responses to the second claim, involving pride in being Surinamese.

Table 6- 5: Claim 1 versus claim 2

CLAIMS		CLAIM 1	CLAIM 2
This message scares me.	**DISAGREE**	158	184
	AGREE	102	67
Chi-square test statistic is 9.069 (exact two sided p-value is 0.003)			
I do not like this message.	**DISAGREE**	210	189
	AGREE	41	53
Chi-square test statistic is 2.474 (exact two sided p-value is 0.136)			
I get the impression that the government wants to exercise control over me.	**DISAGREE**	226	219
	AGREE	30	29
Chi-square test statistic is 0.000 (exact two sided p-value is 1.000)			
The message is very clear to me and I believe it.	**DISAGREE**	14	34
	AGREE	248	220
Chi-square test statistic is 9.887 (exact two sided p-value is 0.002)			
Because of this message I intend to be more careful not using counterfeit medication.	**DISAGREE**	8	20
	AGREE	266	240
Chi-square test statistic is 6.018 (exact two sided p-value is 0.019)			

The results in Table 6-5 provide a few more challenging insights. In that table we compare the sums of the Disagree and Agree scores across the two claims. The first panel of Table 6-5 already shows that the first claim about health is indeed a more threatening claim than the one on pride in being Surinamese. Quite interestingly, panel 4 and 5 of Table 6-5 suggest that the threatening claim is significantly more effective. More people feel that the threatening claim is clear and understandable, and also, relatively more people state that they 'intend to be more careful not to use counterfeit medication'. Hence, in line with Clow and Baack (2007), the threatening claim seems more effective.

6.3   Conclusion

The results in this paper are of course based on answers to survey questions, and it is unknown how effective any factual campaign really would be. We showed that the response to two example claims can generate positive and effective responses, but whether this actually would lead to less consumption of counterfeit medicine is up for further research.

The next step would be to try to arrange that the claims are actually presented on the radio or television, or in printed media. After that, we can hold the same survey as was done in Lede and Franses (2013) to see if awareness has increased and even if behavior has changed. In our future work we intend to proceed with this project and to monitor how awareness on the risks of the use of counterfeit medication can be increased.

Chapter 7

Conclusion

Our research on the demand of counterfeit goods in a developing country aimed to provide empirical evidence. We could collect various unique datasets for the developing country of Suriname and with these we could obtain a better understanding of the demand for counterfeit in countries with developing economies. By examining the demand side of the phenomenon of counterfeiting in a developing country, we provided academics, business practitioners, as well as the relevant government institutions with new and essential empirical information, which hitherto had been relatively scarce. We empowered the relevant stakeholders in their efforts for effective policy making in the battle against the purchase and use of counterfeit goods, by enabling them to enhance and refine their knowledge and understanding of the diffusion

processes of original and counterfeit goods in the developing country of Suriname.

In this last chapter, we provide a summary of the main findings of the five empirical studies, together with their academic and managerial implication. At last, we point out some avenues for further research.

In chapter 2 we studied the diffusion processes of original and counterfeit products in three distinct categories (televisions, mobile phones and DVDs) in Suriname. Based on annual data on original and counterfeit shipments (in kilograms) we conjectured that: (1) counterfeits enter the consumer market a little later than the originals and thus may peak later, (2) diffusion patterns of originals and counterfeits are broadly similar, and (3) total sales of counterfeits outnumber the sales of originals. (4) In addition, we proposed that it is quite likely that deviations from the diffusion paths of originals and counterfeits are not much correlated. As sales records for the selected products do not exist we estimated the diffusion patterns of these products using alternative methods. With our estimates we obtained an impression of the potential size of the market for counterfeits in a developing country, which is new as most studies concern western countries. Our main conclusions were that the

diffusion pattern of original and counterfeit products are broadly similar, with the key difference that counterfeits are launched later and thereby also peak later. Therefore, counterfeit products do not eventually take over and fully wipe out the market for original products. Another remarkable result was that in the end sales of originals and of counterfeits are about equal. Notwithstanding the limitations, which are of course fully due to the fact that our data amount to estimates, based on a range of assumptions, we believe that our findings are of some value for understanding diffusion of counterfeit products

In chapter 3 we discussed the diffusion patterns of pharmaceutical/medical products, using detailed (actual) shipping figures of Suriname's main harbour in Paramaribo, concerning the total shipments (in kilograms) of original and counterfeit (SFFC) medical products across five product categories for 1996-2008. We used the same data creation techniques as in chapter 2. Using various time series techniques we studied how the sales of original and counterfeit pharmaceutical/medical products (or counterfeit drugs) are related, the diffusion processes for original and counterfeit medical products, as well as several policy implications as a means to battle counterfeit pharmaceuticals in Suriname.   For each of the five

categories considered we found that counterfeit drugs and other medical products will eventually make up around 40% of the total shipments in this particular country of Suriname. In our personalized interviews analysed in chapter 5 we discovered that these estimates appear to be rather accurate for SFFC medicines. A second finding is that the diffusion processes of originals and counterfeits are correlated contemporaneously, reacting similarly to the same outside shocks, but that there is no significant lead or lag relationship. This suggests that the original and counterfeit products each address a distinct segment of the market.

As a member of the World Health Organisation (WHO), Suriname (and other developing countries) needs to make greater effort to adopt the WHO schemes and to make more use of the information, instructions, and opportunities presented by the International Medical Products Anti-Counterfeiting Taskforce (IMPACT). Furthermore, the Surinamese government needs to raise the awareness of the citizens, an issue that we addressed in chapter 5. Moreover, not only must the government's legislation and regulation policy be tightened, but the policy regarding control and the effective implementation thereof must also be taken into account.

Given the finding regarding the distinct market segments, a first and immediate conclusion would be that original products would find their way to a richer set of consumers, while the counterfeit products would be targeted at the poorer part of the country. This conclusion could be plausible at first sight, but needs much more refined analysis, as this would assume that all consumers are similarly in need for medical products (regardless for example of their income level), more research on this issue is clearly needed and this is what we pursued in chapter 4.

In chapter 4 we conjectured that cultural norms and values are an important driver of individual purchases of counterfeit products. As norms and values were found to be relevant in other situations concerning illegal activities (Fisman and Miguel 2007), and given that most of the studies concerning the individual purchases of counterfeit products are only based on interviews for one particular group of individuals and never include control groups, we aimed to add to the literature on cultural norms and values by collecting detailed survey data on three groups of individuals which in various dimensions should be similar while in others are very dissimilar.

Holding newly collected data from surveys amongst Surinamese individuals in the Netherlands and in

Suriname against a control group of Dutch individuals in the Netherlands; we presented evidence that cultural norms seem indeed a key driver for purchases of counterfeit products. Since so far we did not find studies where the two additional groups (that is, individuals from the same background in another country and individuals with other origins) were used, our approach contributed new insights to literature.

Our findings indicated that Surinamese people in the Netherlands have assimilated rather well in the Netherlands, with similar sized families, similar age distributions, and, most importantly, similar disposable income levels as the Dutch people. At the same time, the norms and values of Surinamese in the Netherlands are broadly the same as the people in Suriname. In addition, and quite saliently, the attitudes towards purchasing counterfeit products and even the factual purchasing behaviour of Surinamese people in the Netherlands and in Suriname are also broadly similar. This leads us to conclude that purchasing counterfeit products seems to be associated more with cultural norms than with income levels and prices.

This conclusion has various implications. When international organizations or government agencies intend

to reduce the traffic and trade of illegal counterfeits in developing countries, there seems more to be done than just equalizing prices of products and trying to raise income standards (in developing countries). As awareness campaigns are useful, it is important also to consider norms and values. Therefore, as a means to positively influence the perception and ultimately the behaviour of the target group, it is essential that the cultural values of the target group are taken into account in the war against counterfeits.

The collection of the relevant data in chapter 4 was quite involved. As we are personally familiar with people in Suriname and the Netherlands, our choice for these two countries originated out of convenience. Further work in this area could address other large groups of individuals who live in their home country and somewhere abroad (in reasonably large amounts, so that cultural norms and values could be kept as if they would still live in the home country). One could think of Chinese people living in Australia or Turkish people living in Berlin. In addition, when studying alternative samples of data, it is important that one corrects for the potential possibility that answers are given out of social desirability. Finally, one may hold against our study that it is merely a quasi-

experiment which may address cultural differences across Surinamese and Dutch individuals. Future research can be directed at looking at culture-based differences across the Surinamese within Suriname themselves, thus across the ethnicities within one country. This can be done by priming subjects with different cultural information and then measure their answers to relevant questions.

In chapter 5 we examined how aware Surinamese individuals were when purchasing medication in the past, how their current attention for SFFC medicines is when they purchase (obtain) their medication, as well as their attitudes towards SFFC medication. In this investigation we also assessed whether and to what extent consumers are suspicious of having received SFFC medicines (on doctor's prescription) through the official distribution channel (that is: pharmacies), and how health risks, confidence in the official channel as well as several factors with regard to product information correlate with consumer suspicion, alertness when obtaining medicines through the official channel and their use of SFFC medication. In addition we addressed how these aforementioned factors, including consumer (conscious) past purchases of counterfeit products, correlate with consumers their (conscious) past purchases of SFFC

medication. If one would want to change their behaviour, then it is of course important to have insights into consumer perceptions, attitude, alertness and awareness.

As empirical information for Suriname with regard to this subject is scarce, this investigation could be very helpful to fight SFFC medication purchase and use. In this study we analysed the outcomes of a survey amongst individuals in Suriname where we asked about 100 closed questions and statements concerning counterfeit medicines and consumer perception thereof.

The main findings of this study, based on an extensive survey amongst Surinamese individuals, are that having more product information for original medication leads to a smaller probability of purchasing a SFFC medication and at the same time a higher degree of suspicion also leads to a higher probability of such a purchase. In addition, more 'Product information for SFFC medication' and more 'Confidence in the quality of the distribution channel' are found to lead to lesser suspicion of having received an SFFC through an official channel. Finally, people who are confident that based on the product information they can learn whether the medication is original are found to be more alert when obtaining medicines.

Given our results, we recommend that the control (and regulation) with regard to the market of medical products, thus not only in the official distribution channel is increased and tightened. Most certainly, the control in the official distribution channel must be intensified. We also recommend that consumers are (much better) educated on the characteristics of SFFC medication and on how to distinguish SFFC medicines from originals, as a means to improve consumer awareness, and hence to reduce the purchase and use of SFFCs.

In addition, we underline the need to not only inform consumers about SFFC medicines in Suriname, and to the greatly accentuate the quality difference between original and SFFC medicines, but we also stress the importance of emphasizing the potential negative health consequences of these illicit medicines in awareness campaigns (as a means to increase alertness and awareness), with the aim to reduce the purchase and use of SFFC medicines.

Given that this study reported on the first ever detailed survey amongst Surinamese individuals their (conscious) purchase and use of SFFC medicines, our findings can be helpful to fight SFFC medication purchase and use.

we expect that combining this knowledge concerning the scale of SFFC medications on the Surinamese market, the (potential) difference in quality and characteristics of SFFC and original medications, and the potential risks of these illicit medications, with the knowledge to determine the originality of a medication (in those instances where possible) will eventually improve consumer awareness. Based on our results, further research may be directed at investigating which other factors correlate with (or even better: influence) the consumer's alertness, awareness and attitudes, with the aim to influence consumer behaviour more towards the desired direction, which is full awareness and hence the reduction (and were possible: elimination) of the conscious purchases of SFFC medication. Hence, more specific information can be elicited as a means to more effectively battle the phenomenon of SFFC medicines and the potential risks that these illicit goods impose.

Assuming that governments of developing countries like Suriname (where the use of SFFC medical drugs is estimated to be substantial) would want to reduce the use of counterfeit medical drugs (SFFC medicines) in their country then they only have a rather small number of instruments available to them. One of these is an

awareness campaign, of which we tested two types of health messages our final chapter, chapter 6. These two types of health messages could be used in awareness campaigns to try to make people aware and to try to change their undesirable behaviour concerning counterfeit medicines. The first message contained a threatening message, while the second alluded to national pride. On the one hand, threatening health messages could be expected not to be effective as individual responses to such messages could downplay the effect of such messages. On the other hand, fear-inspiring messages can correspond well with goods and services that eliminate problems or threats to the consumers' sense of personal security. The claims that we used in the messages are part of the questions, used in a survey In March 2013 on the use of SFFC medications (Lede and Franses 2013, See chapter 5). Additional to the various questions on the use of SFFC medication in this survey, we also tested the two claims above, and each time we asked 5 questions about these claims.

Our main finding was that the responses to the claims (in the two messages) do not differ across people who use or do not use counterfeit medication. At the same time, the threatening message appears most effective and

it is also best understood. Also, relatively more people state that they 'intend to be more careful not to use counterfeit medication' in case of the threatening message. We are thus tempted to conclude that the threatening message is worth to try in a real-life setting.

As the results of this study were based on answers to survey questions, it is unknown how effective any factual campaign really would be. Given that we showed that the response to the two example claims can generate positive and effective responses, and considering that we did not test whether this actually would lead to less consumption of counterfeit medicine, we proposed to test our claims to the target audience on the radio, television, or in printed media. This will lead to the opportunity to survey target audience to see if awareness has increased and even if behaviour has changed. In addition, future research may also be directed towards monitoring how awareness on the risks of the use of counterfeit medication can be increased.

References

Albert-Miller, N.D. (1999), Consumer misbehaviour: Why people buy illicit goods, Journal of Consumer Marketing, 16, pp. 273-278.

Ang, S., P. Cheng, E. Lim, and S. Tambyah (2001), Spot the difference: Consumer responses towards counterfeits, Journal of Consumer Marketing, 18, pp. 219-235.

Aviram, A. (2010), 'Entrepreneurial Alertness and Entrepreneurial Awareness - Are They The Same?', Academy of Entrepreneurship Journal, vo16, no. 1, pp.111-124.

Bass, Frank M. (1969), A new product growth model for consumer durables, Management Science, 15, pp. 215–227

Bian, X. and C. Veloutsou (2007), Consumers' attitudes regarding non-deceptive counterfeit brands in the UK and China, Brand Management, 14, pp. 211-222.

Bian, X. and L. Moutinho (2009), An investigation of the determinants of counterfeit purchase consideration, Journal of Business Research, 62, pp.368-278.

Bian, X. and L. Moutinho (2011), The role of brand image, product involvement, and knowledge in explaining consumer purchase behaviour if counterfeits: Direct and indirect effects, European Journal of Marketing, 45, pp. 191-216.

Business Action to Stop Counterfeiting and Piracy (BASCAP) (2011), Estimating the global economic and social impacts of counterfeiting and piracy. http://www.iccwbo.org/uploadedFiles/BASCAP/Pages/Global%20Impacts%20-%20Final.pdf

Casola, L. (2007), 'Black Markets: Empirical studies into the economic behaviour of the black market consumer.' University of Canterbury. Retrieved on April 22, 2011, from

http://ir.canterbury.ac.nz/bitstream/10092/1472/1/thesis_fulltext.pdf

Cheng, H., Kotler, N. Lee (2011), Social Marketing for Public Health: Global Trends for Success Stories. Sudbury, MA: Jones and Bartlett Publishers, LLC.

Choenni, C. and C. Harmsen (2007), Place of birth and ethnic composition of the Surinamese in the Netherlands. http://www.cbs.nl/NR/rdonlyres/B423BB56-A099-4272-86B0-2BB2021E7468/0/2007k1b15p74art.pdf

Cismaru, M., A. Lavack, and E. Markevich (2009), Social marketing campaigns aimed at preventing drunk driving; A Review and recommendations, International Marketing Review, 26, pp. 292-311.

Clow, K., and D. Baack (2007), Integrated Advertising, Promotion, and Marketing Communications, 3rd edn, Pearson Education Inc./ Prentice Hall, Upper Saddle River, New Yersey.

Commuri, S. (2009), The impact of counterfeiting on genuine-item consumers' brand relationships, Journal of Marketing, 73, pp. 86-98.

Conner, Kathleen Reavis and Richard P. Rumelt (1991), Software piracy: An analysis of protection strategies, Management Science, 37, pp. 125-139

Cordell, V.V., N. Wongtada and R.L. Kieschnick (1996), Counterfeit purchase intentions: Role of lawfulness attitudes and product traits as determinants, Journal of Business Research, 35, pp. 41-53.

De Matos C.A., C. Ituassu, C. Vargas Rossi (2007), 'Consumer attitudes toward counterfeits: a review and extension', Journal of Consumer Marketing, vol. 24, no. 1, pp. 36- 47

Desiraju R, H. Nair, and P. Chintagunta (2004), Diffusion of new pharmaceutical drugs in developing and developed nations, International Journal of Research in Marketing, 21, pp. 341-357.

Dixon, P., & C. Greenhalg (2002), 'The Economics of Intellectual Property: A Review to Identify Themes for Future Research', Oxford Intellectual Property Research Centre St. Peter's College, Oxford.

Eisend, M. and P. Schuchert-Güler (2006), Explaining counterfeit purchases: A review and preview, Academy of Marketing Science Review, 12, pp. 1-26.

Fisman, R. and E. Miguel (2007), Corruption, norms, and legal enforcement: Evidence from diplomatic parking tickets, Journal of Political Economy, 115 (6), pp. 1020-1048.

Franses, Ph. and M. Lede (2010), 'Diffusion of counterfeit medical products in a developing country: Empirical evidence for Suriname', Erasmus Institute Report 2010-38, Erasmus School of Economics

Franses, Ph. and M. Lede (2010), Diffusion of original and counterfeit products in a developing country, Econometric Institute Report 2010-08, Erasmus School of Economics.

Franses, Ph. and M. Lede (2012), Income, cultural norms and purchases of counterfeits, Econometric Institute Report 2012-18, Erasmus School of Economics.

Franses, Philip Hans (1998), Time Series Models for Business and Economic Forecasting, Cambridge: Cambridge University Press.

Fritzsche, D. and E. Oz (2007), Personal values' influence on the ethical dimension of decision making, Journal of Business Ethics, 75, pp. 335-343.

Gautam, C., A. Utreja, G. Singal (2009), 'Spurious and counterfeit drugs: a growing industry in the developoing world', Postgrad Med J, no 85, pp. 251-256.

Harvey, P.J. and W.D. Walls (2003), Laboratory markets in counterfeits goods: Hong Kong versus Las Vegas, Applied Economics Letters, 10, pp. 883-887.

Health Research for Action (HERA) (2010), 'Strengthening of Pharmaceutical Quality Assurance and Legislation', Final report, Part I - main report, Belgium.

International Anti-Counterfeiting Coalition Inc. (IAAC) (2011), Intellectual Property Rights Fiscal Year 2011 Seizure Statistics. http://4356049642aa3c99a6e91c99180a8219894d6198.gripelements.com/pdf/news/ipr-fy-2011-seizure-report.pdf

International Medical Products Anti-Counterfeiting Taskforce (IMPACT) (n.d.-a), Regulatory Implementation Working Group. Retrieved on April 18, 2013 from

http://www.who.int/impact/working_groups/wg_regulatory/en/

International Medical Products Anti-Counterfeiting Taskforce (IMPACT) (n.d.-b), About us. Retrieved on April 18, 2013 from http://www.who.int/impact/about/en/

International Medical Products Anti-Counterfeiting Taskforce (IMPACT) (2008), Counterfeit Drugs Kill, (IMPACT Brochure counterfeit medicines- on the internet).

Kamakura, W. and J. Mazzon (1991), Value segmentation: A model for the measurement of values and value systems, Journal of Consumer Research, 18, pp. 208-218.

Kelesidis, T., I. Kelesidis, P. Rafailidis, M. Falagas (2007), 'Counterfeit or substandard antimicrobial drugs: a review of the scientific evidence', Journal of Antimicrobial Chemotherapy, vol. 60, no. 2, pp. 214-36.

Kwong, K.K., O. Yau, S. Lee, L. Sin, A.Tse (2003), 'The Effects of Attitudinal and Demographic Factors on Intention to Buy Pirated CDs: The Case of Chinese

Consumers', Journal of Business Ethics, vol. 47, no. 3, pp. 223-235.

Lai, K. K.-Y. and J.L. Zaichkowsky (1999), Brand imitation: Do the Chinese have different views?, Asia Pacific Journal of Management, 16, pp.179-192.

Lamphone,S., S. Freudenthal, G. Tomson,R. Wahlström (2004), 'Knowledge and perceptions of drug quality among drug sellers and consumers in Lao PDR', Health Policy and Planning. vol. 19, no. 6, pp. 391-401

Lede, Madesta (2013), Consumers' attitudes towards SFFC medicines: Evidence for a developing country, Working Paper (in progress).

Luttmer, E.F.P. and M. Singhal (2011), Culture, context, and the taste of redistribution, American Economic Journal: Economic Policy, 3, pp. 157-179.

Ministry of Health (2005), National Medicines Policy Suriname 2005 - 2008 (Dutch: Het Nationaal Geneesmiddelenbeleid 2005-2008), Council for the National Vital medicines Program, Government Publishing Service, Paramaribo.

Ministry of Health (2011), Fake Medicine Briefing Ministry of Health (Dutch: Nepmedicijnen brieving Ministerie van Volksgezondheid), media release, Paramaribo.

Moshe G., V. Mahajan and E. Muller (1995), Software piracy: Estimation of lost sales and the impact of software diffusion, Journal of Marketing, pp. 59, 29-37

Nicholaas, H and A. Sprangers (2007), Foreign migration in the Netherlands 1795-2006: the impact on population composition.
http://www.cbs.nl/NR/rdonlyres/6A1AD820-F436-4039-AC85-F19B5673E8AB/0/2007k4b15p32art.pdf

Norton, J. and F. Bass (1987), A diffusion theory model of adoption and substitution for successive generations of high-technology products, Management Science, 33, pp. 1069–1086

Organisation for Economic Co-operation and Development (OECD), (2007-a). Retrieved March 29, 2012, from http://stats.oecd.org/glossary/index.htm

Organisation for Economic Co-operation and Development (OECD), (2007-b), 'The economic impact of counterfeiting and piracy'. Retrieved on March 29, 2012, from http://www.oecd.org/dataoecd/13/12/38707619.pdf

Organisation for Economic Co-operation and Development (OECD), (2009). Magnitude of counterfeiting and piracy of Tangible products: an update. Retrieved April 9, 2013, from http://www.oecd.org/sti/ind/44088872.pdf

Orizio, Grazia, Sara Rubinelli, Peter J. Schultz, Serena Domenighini, Maura Bressanelli, Luigi Cami, and Umberto Gelatti (2010), 'Save 30% if you by today'. Online pharmacies and the enhancement of peripheral thinking in consumers, Pharmacoepidemiology and Drug Safety, 19 (9), pp. 970-976.

O'Shaughnessy, J. 1987, Why People Buy, Oxford University Press, New York, NY.

Pan American Health Organization (PAHO) (2010), Suriname Pharmaceutical Country Profile. http://www.who.int/medicines/areas/coordination/suriname_pharmaceutical_profile_April_2011.pdf

Rogers, R.W. (1975), A protection motivation theory of fear appeals and attitude change, Journal of Psychology, 91, pp. 93-114.

Rokeach, M. and S.J. Ball-Rokeach (1989), Stability and change in American value priorities, 1968–1981, American Psychologist, 44, pp. 775-784.

Scorpecci, D. (2009), 'The economic impact of counterfeiting and piracy. Organisation for Economic Co-operation and Development (OECD)'. Retrieved March 29, 2012, from http: //www.oepm.es/cs/OEPMSite/contenidos/ponen/InformeO CDE26feb09/Danny_Scorpecci_OECD_Madrid_Presentat ion.pdf

Staake, Thorsten, F. Thiesse, and E. Fleisch (2009), The emergence of counterfeit trade: A literature review, European Journal of Marketing, 43, pp. 320-349

Statistics Netherlands (CBS) (Dutch: Centraal Bureau voor de Statistiek),(2011) 'Population Trends. Statistical quarterly devoted to the demography of the Netherlands. Volume 59 - 1st quarter 2011' (Dutch: Bevolkingstrends. Statistisch kwartaalblad over de demografie van

Nederland. Jaargang 59 – 1e kwartaal 2011). Retrieved on April 19, 2012, from http://www.cbs.nl/nr/rdonlyres/476f84a8-b876-43b4- aa21- 350338c052eb/0/2011k1b15pub.pdf

Stremersch, Stefan and Aurelie Lemmens (2009), Sales growth of new pharmaceu-ticals across the globe: The role of regulatory regimes, Marketing Science, 28, pp. 690-708.

Swidler, A. (1986), 'Culture in Action: Symbols and Strategies'. American Sociological Review, vol. 51, no2, pp. 273-286.

Tan, B. (2002), Understanding Consumer Ethical Decision Making With Respect to Purchase of Pirated Software', Journal of Consumer Marketing, 19 (2), pp. 96-111.

Ten Hoor, G., G.J. Peters, J. Kalagi, L. de Groot, K. Grootjans, A. der Huschens, C. Kohninger, L. Kolgen, I. Pelssers, T. Schutt, S. Thomas, R. Ruiter, and G. Kok (2012), Reactions to threatening health messages, MBC Public Health, 12, article 1011.

Tom, G., B. Garibaldi, Y. Zeng and J. Pilcher (1998), Consumer demand for counterfeit goods, Psychology & Marketing, 15, pp. 405-421.

Vitell, S. (2003), Consumer ethics research: Review, synthesis and suggestions for future research, Journal of Business Ethics, 43, pp. 33-47.

Wang, F. H. Zhang, H. Zang, and M. Ouyang (2005), Purchasing pirated software: An initial examination of Chinese consumers, Journal of Consumer Marketing, 22, pp. 340-351.

Wee, C., S. Tan, and K. Cheok (1995), 'Non-Price Determinants of Intention to Purchase Counterfeit Goods: An Exploratory Study', International Marketing Review, vol. 12, no. 6, pp.19 - 46.

Wilcox, K., H.M. Kim, and S. Sen (2009), Why do consumers buy counterfeit luxury brands? Journal of Marketing Research, 46 (2), pp. 247-259.

Wildavsky, A. (1987), 'Choosing Preferences by Constructing Institutions: A Cultural Theory of Preference

Formation', The American Political Science Review, vol. 81, no. 1, pp. 3-22.

World Health Organisation (WHO) (2012), Media centre. Medicines: spurious/falsely-labelled/ falsified/counterfeit (SFFC) medicines. Retrieved April 19, 2013, from http://www.who.int/mediacentre/factsheets/fs275/en/index .html

World Health Organisation (WHO) (n.d.-a), Programmes and projects: Medicines. Retrieved April 19, 2013, from http://www.who.int/medicines/services/counterfeit/overvie w/en/

World Health Organisation (WHO) (n.d.-b), Programmes and projects: Impact. Retrieved April 19, 2013, from http://www.who.int/medicines/services/counterfeit/faqs/co unt_q-a/en/

World Trade Organisation (WTO),(2012), 'TRIPS: A more detailed Overview of the TRIPS agreement'. Retrieved March 29, 2012, from http://www.wto.org/english/tratop_e/trips_e/intel2_e.htm# patents

Nederlandstalige samenvatting

Bijna elk type product (goed) is door de jaren heen illegaal nagemaakt en ten verkoop aangeboden. Bovendien wordt ook verondersteld dat het aantal namaakproducten een stijgende trend zal blijven vertonen. Gezien het feit dat vrijwel elke economie te maken heeft met illegaal nagemaakte producten oftewel namaakproducten- hetzij met betrekking tot de productie of de distributie van deze goederen- wordt in dit proefschrift de vraagzijde van dit fenomeen onderzocht, in een zich ontwikkelend land, in ons geval: Suriname. Door de toename van de wereldhandel in bijna alle landen in de wereld, met uitzondering van een paar autarkische landen, is er ook een groeiende interesse in het bestuderen van verschillende aspecten van de handel in namaakproducten. Door middel van dit onderzoek het gebruik van namaakgoederen in een zich ontwikkelend land leveren wij nieuw empirisch bewijs aan, dat de bestaande kennis en het begrip ten aanzien van dit onderwerp uitdiept en waar nodig zuivert, waardoor de mogelijkheden om de

aankoop en het gebruik van namaakproducten (vooral namaakgeneesmiddelen) te bestrijden, toenemen.

In dit proefschrift bestuderen wij de mogelijke diffusieprocessen voor originele en namaakproducten, met inbegrip van medische producten. Ook onderzoeken wij de invloed van culturele normen op de aankoop van namaakproducten door consumenten. Dit, omdat wij ervan uitgaan dat de culturele normen en waarden een belangrijke aanjager zijn van individuele aankopen van namaakproducten. Ook verzamelen wij gegevens over individuele consumenten. Wij onderzoeken hoe bewust (oplettend) individuele consumenten waren bij de aankoop van medicijnen in het verleden, en hoe hun huidige aandacht voor SFFC geneesmiddelen is wanneer zij hun medicatie aanschaffen. Ook bestuderen wij de houding van consumenten ten opzichte van SFFC medicatie en hun (eventuele) bewuste aankoop van deze namaakproducten. Ten slotte bestuderen wij twee verschillende soorten berichten, betrekkinghebbende op de gezondheid, die gebruikt kunnen worden in bewustmakingscampagnes tegen de aankoop en het gebruik van namaakgeneesmiddelen.

Deze scriptie is gebaseerd op verschillende reeksen van unieke en nieuw verzamelde data.

About the author

Madesta M. Lede was born on June 22, 1983 in Paramaribo, Suriname. In February 2007 she obtained her bachelor's degree in Economics with a major in Marketing at the Faculty of Social Sciences of the Anton de Kom University of Suriname (AdeKUS). In that same year she was one of the selected few who received a scholarship in order to obtain a master's degree from Erasmus University Rotterdam (EUR). This was part of a partnership of the Erasmus School of Economics (ESE) with the Faculty of Social Sciences of the AdeKUS, as a means to strengthen the scientific staff of the latter university. In 2008 Madesta obtained her master's degree in Economics and Business with a specialisation in Marketing at ESE. After returning to Suriname, she has been appointed deputy researcher at the AdeKUS in 2009. In this same year she started her research project in order to obtain her Ph.D. under the guidance of Prof.dr. Ph. Franses of ESE.