Are We Underestimating the Gains from Globalization for the United States?
Christian Broda and David Weinstein
May 2004

The US economy has come a long way since Henry Ford issued his famous quip that customers could have cars in “any color as long as it is black.” Today’s consumers are able to access a large variety of goods that were not available in the past. They can not only choose their cars from hundreds of different varieties but they can also consume new products like minivans and SUV’s. One way in which consumers can increase their choice of goods is through international trade. Trade with other nations allows US consumers to choose from a variety of goods that are not available to them domestically. For example, it is principally through trade that Americans can access Japanese cars, French wine and Irish beer.

Having more varieties from which to choose from usually entails a welfare gain to the consumer. The magnitude of this gain will depend on the similarity between the new varieties and the existing varieties of the same good. For example, if Irish beer is not a perfect substitute for American beer, US consumers benefit from trade with Ireland because it enables them to consume both varieties of beers. Obviously, if varieties are highly substitutable, as might be true for varieties of gasoline, then increasing the number of varieties is unlikely to have much of an effect on welfare. In other words, if globalization allows people to consume new varieties that they care about, there can be gains from globalization which are not captured in standard measures.

In this edition of Current Issues, we examine the impact that the growth of new goods and varieties available through international trade has had on the welfare of US citizens. We do this using the most disaggregated import data available for the period between 1972 and 2001. After describing the evolution of the number of imported varieties available to US consumers in the last 30 years, we answer two questions: 1) How much
do conventional import price indexes overstate import price inflation by not taking new
goods and varieties into account? And 2) How much has the increase in imported
varieties raised US welfare?

We find that there has been a four-fold increase in available global varieties in the
last 30 years. As a result, conventional import price indexes, which do not take this into
account, have overstated import price inflation by 1.2 percentage points per year.
Moreover, this significant increase in choice has produced a large welfare gain for the
United States. We estimate that consumers would be willing to pay $280 billion per year or
3 percent of GDP to access the wider range of goods. This represents a large gain from
trade that had not been previously quantified since estimates of the traditional gains are
confined to changes in the prices of existing products. Failing to account for the gains from
the introduction of new goods ignores an important element in the arguments for free trade.

Why do varieties matter?

Classical international trade theory postulates that the elimination of trade barriers
improves welfare by reducing the wedge between domestic and import prices. Countries
gain because the cost of consumption falls relative to income. New models of international
trade provide an entirely different reason for the gains from trade. Countries gain from
trade not because the prices of any individual good changes, but rather because
consumers in open economies have access to a wider variety of goods than consumers in
closed economies. These models are typically predicated on an assumption that no one
country can produce all of the varieties available in the world. If consumers value variety
and countries cannot produce all varieties due to, say, a fixed cost in the production of
each variety, countries stand to gain from trade because it expands the set of available
varieties.
In these new trade models, the gains from trade hinge crucially on a number of parameters and variables. The first is the elasticity of substitution among varieties, or how substitutable consumers believe varieties to be. If varieties of a particular good are perfectly substitutable, then having two varieties of that good will have no impact on welfare. For example, most consumers care about the price and grade of their fuel, but not which oil field it came from. Second, quality variation across varieties may matter. Presumably, most Americans care more about having access to French red wine than to Japanese red wine. Finally, import quantity matters as, ceteris paribus, one cares more about variety growth in sectors that occupy a large share of consumption than in small sectors.

How has variety changed in US imports since 1972?

The simplest way to answer this question is to look at what has happened to the count of goods and varieties that enter the US. We will start by examining the most disaggregated trade data available (TSUSA 8-digit or HTS 10-digit), which breaks US imports into approximately 15,000 goods, with definitions like red wine in bottles of under 1 liter. We can then define a variety to be a good emanating from a particular country, e.g. French red wine.¹

There are two unmistakable trends in the data (see Table 1). The first is a dramatic increase in the number of measured goods. Looking at the earlier TSUSA data, we see that the number of categories in which the US imported almost doubled between 1972 and 1988, rising from 7731 goods to 12,822. Similarly between 1990 and 2001, the number of categories rose from 13,941 to 16,390. Overall, it appears that only half

¹ Performing this exercise illustrates both the power and the shortcomings of working with trade data. On the one hand it enables us to examine the interactions of literally hundreds of thousands of varieties—a level of aggregation so fine that the typical consumer spends no more than a penny per year on each. On the other hand, as the example of French red wine indicates, the data aggregates together many varieties that surely exist within a category.
to two-thirds of the categories in both samples remained the same. Moreover, approximately one third of the categories in each sample disappeared by the end of each sample period. This indicates the enormous importance of thinking about the creation and destruction of goods when thinking about globalization. Regardless of whether the changes in the numbers of goods are due to actual changes in the goods we import or changes in just the categories themselves, the point remains that the creation and destruction of goods or categories is a prominent feature of the data that typically has not been taken into account in discussions of globalization.

The second trend that we can see is a dramatic increase in the number of countries exporting each good to the US. Columns 3 reports the median number of countries exporting a good to the US. These data also reveal a substantial increase in the number of countries supplying each individual good. Between 1972 and 2001, the median number of countries doubled, rising from six countries in 1972 to 12 countries today. In other words, even if we leave aside the issue of why the number of imported categories has increased over time, the data reveal that there has been a dramatic increase in the number of countries supplying each individual good.

Taken together, the data in Table 1 suggests that the number of varieties (column 4) rose 133 percent in the first period and 57 percent in the second period – a total increase of 251 percent. This increase constitutes an almost four fold rise in the number of varieties over the last three decades. Roughly half of this increase appears to have been driven by a doubling in the number of categories and half by a doubling in the number of countries supplying each good.

To get a more concrete sense of what is driving these movements, it is worthwhile to look at some sample categories. In some cases, the change arises from a clear increase in the number of countries exporting a given well-defined good. For example, in 1972, the US imported roasted or ground coffee from 25 countries. By 2001,
however, the US was importing roasted coffee from 52 countries. Similarly the number of countries supplying beer and wine to the US rose by about 195% and 50%, respectively. Looking at non-food items, we see similar types of increases. The number of countries supplying eyeglasses rose from 9 to 47.

In other cases, the growth involves a mix of new goods and new sources for each good. Car audio is a good example of this. In 1972, 21 countries exported car radios of all types to the US. By the year 2001, there were nine different categories for car audio systems with as many as 28 countries exporting each category. Overall, the apparent number of varieties rose from 21 to 174. Clearly some of this increase, e.g. splitting the single 1972 category into the 2001 categories of AM radios and AM/FM radios, does not represent an increase in new goods. Other categories, however, e.g. radios with tape and CD players or radios with just CD players, probably do constitute a bona fide increase in choice.

Where is the increased variety coming from?

Table 2 presents data on the numbers of goods exported to the US by country. The first column ranks them from highest to lowest for 1972 and the following columns rank them for subsequent years. Not surprisingly, the countries that export the most varieties to the US tend to be large, high-income, proximate economies. Looking at what has happened to the relative rankings over time, however, reveals a number of interesting stylized facts. First, Canada and Mexico have risen sharply in the rankings. Canada moved from being the fourth largest source of varieties to first place while Mexico moved from thirteenth to eighth place. This may reflect the sequence of free-trade areas that have been created over the last several decades.

---

2 Technically the later category only contains coffee in packages of under 2KG and not decaffeinated. The actual number of suppliers could be higher.
Growth, perhaps coupled with liberalization, also appears to have played some role. Fast growing economies like China and Korea rose dramatically in the rankings. In Table 3 we present a detailed breakdown of Chinese exports. The growth in varieties is stunning. In 1972, China only exported 510 different goods to the US as opposed to 10,199 today. In other words, while Chinese firms only competed in 0.6 percent of the import markets in existence in 1972, they participate in 62 percent of the markets today. Thus, although Chinese firms only account for 9 percent of all imports into the US, there is a Chinese firm selling in almost two-thirds of the US import markets.

The twenty fold increase in the number of varieties exported by China has produced a dramatic change in China’s relative position: moving from the 28th most important source of varieties in 1972 to the fourth most important today. Similarly, after India began its period of liberalization in the last decade, its growth rate rose sharply as did the number of goods it began exporting. At the other extreme are the economies like Japan and Argentina that have seen fairly substantial drops in the number of varieties they export. The situation for Japan looks particularly dire with the number of varieties falling below that of China.

**How to calculate welfare gains from new varieties?**

Despite the wide recognition of these new theories, standard national statistics do not account for how much better off consumers are when a new variety of an existing good or a new good becomes available. In particular, the CPI measures the current cost of a fixed basket of goods and services. By contrast, a cost-of-living index (COLI) measures the cost of maintaining a certain “standard of living,” without restrictions on what is in the basket. While COLI is a recognized measurement goal of the CPI, it is a theoretical

---

3 Until 1998, the CPI used expenditure data from 1982 to 1984 to construct the market basket of goods and services. In 1998, the base period was revised to 1993-95, which is still used at present.
construct without a single or straightforward index formula that can be used in practice. Therefore, it is difficult for the CPI to keep track of all the factors that affect the cost of living in today’s dynamic economy. In particular, the continual introduction of new goods creates a wedge between the CPI and COLI.

The introduction of new goods in the market increases our “standard of living” and therefore should reduce the cost of maintaining a consumer’s well-being. Some of the new products are similar to old ones, but many of the new products have improved our standards of living in significant ways.\(^4\) Thus, increases in the variety of goods available for consumption reduce the value of a COLI but are mostly ignored in the way the CPI is currently measured.\(^5\)

Measuring the impact of this increase on US welfare is a complex process. In order to obtain an estimate of the gains from new varieties for the US, we need to put a bit more structure on the data. We use an illustrative example to highlight the key aspects of this calculation for a simple case in which there is no quality variation across varieties and all varieties are priced identically. (A more detailed explanation can be found in Broda and Weinstein (2004)).

The starting point for our calculation is to make some assumptions about how consumers think about varieties. Here, we will assume all consumers evaluate varieties using a constant elasticity of substitution (CES) utility function that places equal weights on imports from every country. If the prices of all imports are identical and there are no

\(^{4}\) To take a few examples: cellular phone services has freed up some segments of the population from spatial confines, VCRs and the DVDs have enhanced our ability to view movies, and the personal computer has revolutionized the way people do business and communicate.

\(^{5}\) Current statistical procedures do not do a very good job of identifying, measuring, and estimating the value and the pricing of new products as they enter the economy. The BLS approach is to omit the introduction of new goods in its calculation of the CPI until they are eventually discovered as part of the gradual rotation of the sample of goods. Even when the no-longer-new-good eventually enters the CPI calculation, no adjustment is made for the consumer gains it provides in relation to the earlier goods.
differences in quality across goods, we can write the cost-of-living price index that takes variety growth into account, \( P^v_c \), as

\[
P^v_c = P_c \times \prod_{g} \left( \frac{n_{gc72}}{n_{gc01}} \right)^{1/(\sigma_g - 1)}
\]

where \( P_c \) is the conventional price index, \( n_{gc72} \) is the number of varieties of good \( g \) imported by country \( c \) in the year 1972, \( n_{gc01} \) is this number for 2001, and \( \sigma_g > 1 \) is the elasticity of substitution among varieties of a different good. A few things are worth noting in this example. There are two key components to understanding how to take variety growth into account. The first is that increasing the number of source countries for a given good will lower the ratio of old to new varieties, \( n_{gc72}/n_{gc01} \), and hence the cost-of-living index. This reflects the assumption that consumers care about having more choice. The second feature of equation (1) is that the amount that new varieties affect the cost-of-living price index depends on \( \sigma_g \) or how substitutable varieties of each good are. If varieties are very similar, then this implies that \( \sigma_g \) is large, the exponent in (1) is small, and increases in the number of varieties will have little effect on the price index. To sum, our methodology assumes that there are two determinants underlying how varieties affect the real price index: the magnitude of the increase in varieties and the degree of similarity among varieties.

An undesired feature of this illustrative example is that a measure based on the number of varieties would erroneously capture a split or merge of a category as a change in the number of varieties and hence changes in the price level. Fortunately however, the true methodology used to calculate the welfare gains (explained in Broda and Weinstein (2004)) is robust to a wide variety of data problems arising from the creation and destruction of product categories. For example, if goods are randomly split or merged, then the index remains unchanged.
As the analysis above suggests, a fundamental input to the calculation of a true cost-of-living index that incorporates variety growth are the elasticities of substitution of the many goods that form the index. Broda and Weinstein (2004) essentially use Feenstra’s (1994) methodology to estimate 30,000 elasticities of substitution.

Table 4 shows the elasticities of substitution for the 20 largest SITC-5 sectors in US imports in each of the periods. For the period between 1972 and 1988 the sector with the highest elasticity of substitution among this group was that of crude petroleum and shale oil. The estimated sigma for this sector was 9.7, almost five times larger than the sigma for Footwear ($\sigma_{\text{footwear}} = 2.0$), the sector with the smallest elasticity among the largest sectors. In the latter period, we also find that sectors related to petroleum have the highest elasticities.

The impact of increased import variety on US real income

Overall, variety growth implies that the variety adjusted unit price for imports fell 22.5 percent faster than the unadjusted price between 1972 and 1988 or about 1.6 percentage points per year. Interestingly, the impact of variety growth was much smaller during the 1990s. Between 1990 and 2001, the growth of varieties meant that the cost of living price index fell 5 percent faster than the unadjusted index over this time period or about 0.5 percent per annum. The lower rate of decline in the later period may reflect the fact that much of the gains from globalization arising from a rise in importance of East Asian trade may have been realized prior to 1990. Throughout the entire period we find that the growth of varieties reduces the exact price relative to the conventionally measured import price index by 28.1 percent.

It is difficult to find a benchmark with which to compare our results. We are not aware of any study that measures the impact of variety on aggregate prices, and the papers that study a single good at the micro-level (or at most a few goods) are not suitable for this
comparison. Given the lack of aggregate effects of variety in the literature, we will the effects that other sources of bias (quality change, outlet substitution, etc.) have on the overall consumer price index use as a reference. In mid-1995 a commission was appointed to study the potential biases in the existing measurement of the Consumer Price Index. This CPI Commission concluded that the change in the consumer price index overstates the change in the cost of living by about 1.1 percentage points per year (Boskin et al., 1996). Several sources of bias are considered, but the main source is the incorrect measurement of quality change of products. The effect of quality change alone can account for about 0.6 percentage points in the overall index. These numbers suggests that the bias we find in the import price index as a result of the unaccounted variety growth is very large. That is, the bias due to variety growth in the import price index is twice as large as the bias induced by quality change in the overall price index and as large as the total bias from all sources.

Using this adjusted import price index, we estimate the impact of new imported varieties on US welfare and find that the value to US consumers from the increase in global varieties is 280 billion dollars or about 3% of US GDP. Around 2 percentage points accrue to the earlier period. These gains from variety are 3 to 6 times larger than the estimated gains from eliminating protectionism (e.g., Krugman (1990), Feenstra (1992) and Romer (1994)) and around 10 times larger than the estimated gains from eliminating business cycles (Alvarez and Jermann (2000)).

Conclusion

The accurate measurement of prices is a critical component to understanding the gains from new varieties. This paper reports the results from the first attempt to structurally estimate the impact of new varieties on the US import price index. The results are striking. By not accounting for new varieties, we estimate that the conventional measure of import prices overstates import price inflation by 1.2
percentage points per year. In other words, the real cost of imports was almost 30 percent lower in 2001 than it was in 1972. We estimate that this drop in import prices have raised US welfare by 280 billion dollars or around 3 percent of GDP.

The results suggest that there are potentially large implications for understanding the role new varieties on prices and welfare. In the future, it seems important that we obtain a better understanding of how variety growth affects the domestic economy as well as how foreign countries benefit from this channel of globalization.

References:


## Table 1: Variety in US Imports (1972 - 2001)

### US Imports 1972-1988

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Goods</th>
<th>Median Number of Exporting Countries</th>
<th>Total Number of Varieties (country-good pairs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>All 1972 goods</td>
<td>1972</td>
<td>7731</td>
<td>6</td>
</tr>
<tr>
<td>All 1988 goods</td>
<td>1988</td>
<td>12822</td>
<td>9</td>
</tr>
<tr>
<td>Common 72-88</td>
<td>1972</td>
<td>4171</td>
<td>6</td>
</tr>
<tr>
<td>Common 72-88</td>
<td>1988</td>
<td>4171</td>
<td>10</td>
</tr>
<tr>
<td>1972 not in 1988</td>
<td>1972</td>
<td>3560</td>
<td>7</td>
</tr>
<tr>
<td>1988 not in 1972</td>
<td>1988</td>
<td>8651</td>
<td>8</td>
</tr>
</tbody>
</table>

### US Imports 1990-2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Goods</th>
<th>Median Number of Exporting Countries</th>
<th>Total Number of Varieties (country-good pairs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>All 1990 goods</td>
<td>1990</td>
<td>14572</td>
<td>10</td>
</tr>
<tr>
<td>All 2001 goods</td>
<td>2001</td>
<td>16390</td>
<td>12</td>
</tr>
<tr>
<td>Common 90-01</td>
<td>1990</td>
<td>10636</td>
<td>10</td>
</tr>
<tr>
<td>Common 90-01</td>
<td>2001</td>
<td>10636</td>
<td>13</td>
</tr>
<tr>
<td>1990 not in 2001</td>
<td>1990</td>
<td>3936</td>
<td>10</td>
</tr>
<tr>
<td>2001 not in 1990</td>
<td>2001</td>
<td>5754</td>
<td>11</td>
</tr>
</tbody>
</table>

Notes: For the period 1972-1988 goods are defined at the TSUSA level (8-digit). For the later 1990-2001 period, 10-digit HTS data is used. Source: NBER CD-ROM and http://data.econ.ucdavis.edu/intern...
## Table 2: Ranking in terms of Number of Goods Imported by US

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPAN</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>UKINGDOM</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>GERMANY</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>CANADA</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>FRANCE</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>ITALY</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>SWITZLERD</td>
<td>7</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>HONGKONG</td>
<td>8</td>
<td>9</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>NETHLDS</td>
<td>9</td>
<td>13</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>TAIWIAN</td>
<td>10</td>
<td>7</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>SPAIN</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>BEL_LUX</td>
<td>12</td>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>MEXICO</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>SWEDEN</td>
<td>14</td>
<td>17</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>DENMARK</td>
<td>15</td>
<td>22</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>AUSTRIA</td>
<td>16</td>
<td>18</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>INDIA</td>
<td>17</td>
<td>19</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>KOREA_S</td>
<td>18</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>19</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>AUSTRAL</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>ISRAEL</td>
<td>21</td>
<td>21</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>PORTUGAL</td>
<td>22</td>
<td>26</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>NORWAY</td>
<td>23</td>
<td>31</td>
<td>31</td>
<td>37</td>
</tr>
<tr>
<td>IRELAND</td>
<td>24</td>
<td>27</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>FINLAND</td>
<td>25</td>
<td>28</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>COLOMBIA</td>
<td>26</td>
<td>33</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>PHIL</td>
<td>27</td>
<td>25</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>CHINA</td>
<td>28</td>
<td>10</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>ARGENT</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td>GREECE</td>
<td>30</td>
<td>38</td>
<td>44</td>
<td>47</td>
</tr>
</tbody>
</table>

Notes: Top 30 countries in 1972 included. Same notes as in table 1 apply.
<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Goods</th>
<th>Share of Total US Imports in year</th>
</tr>
</thead>
<tbody>
<tr>
<td>All 1972 goods</td>
<td>1972</td>
<td>510</td>
</tr>
<tr>
<td>All 1988 goods</td>
<td>1988</td>
<td>4673</td>
</tr>
<tr>
<td>Common 72-88</td>
<td>1972</td>
<td>215</td>
</tr>
<tr>
<td>Common 72-88</td>
<td>1988</td>
<td>215</td>
</tr>
<tr>
<td>1972 not in 1988</td>
<td>1972</td>
<td>295</td>
</tr>
<tr>
<td>1988 not in 1972</td>
<td>1988</td>
<td>4363</td>
</tr>
</tbody>
</table>

Table 3: US Imports from China

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Goods</th>
<th>Share of Total US Imports in year</th>
</tr>
</thead>
<tbody>
<tr>
<td>All 1989 goods</td>
<td>1989</td>
<td>5587</td>
</tr>
<tr>
<td>All 2001 goods</td>
<td>2001</td>
<td>10199</td>
</tr>
<tr>
<td>Common 89-01</td>
<td>1989</td>
<td>3567</td>
</tr>
<tr>
<td>Common 89-01</td>
<td>2001</td>
<td>3567</td>
</tr>
<tr>
<td>1989 not in 2001</td>
<td>1989</td>
<td>2002</td>
</tr>
<tr>
<td>2001 not in 1989</td>
<td>2001</td>
<td>6582</td>
</tr>
</tbody>
</table>
### Table 4: Sigmas for the 10 SITC-5 Sectors with the Largest Import Share by Period

#### Period 1972-1988

<table>
<thead>
<tr>
<th>SITC-5</th>
<th>Sigma</th>
<th>Average Share (in %)</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>78100</td>
<td>2.29</td>
<td>19.80</td>
<td>MOTOR CARS &amp; OTH PASSENGER VEHICLES</td>
</tr>
<tr>
<td>33300</td>
<td>9.66</td>
<td>10.10</td>
<td>CRUDE PETROLEUM, SHALE OIL INC RECONST, TEST 25DEG API AOV</td>
</tr>
<tr>
<td>76210</td>
<td>6.29</td>
<td>5.14</td>
<td>RADIO TAPE PLAYER AND RECEIVERS FOR MOT VEH, NO BATTERY OPERATION</td>
</tr>
<tr>
<td>93100</td>
<td>8.51</td>
<td>5.11</td>
<td>SPECIAL TRANSACTIONS &amp; COMMOD NOT CLASSIF BY KIND</td>
</tr>
<tr>
<td>33440</td>
<td>4.08</td>
<td>2.93</td>
<td>FUEL OILS, HEAVY, CONDENSATE AND NO.4-TYPE</td>
</tr>
<tr>
<td>64110</td>
<td>2.53</td>
<td>2.64</td>
<td>NEWSPRINT PAPER</td>
</tr>
<tr>
<td>78500</td>
<td>3.00</td>
<td>2.51</td>
<td>PARTS AND ACCESSORIES OF MOTOR VEHICLES, ETC</td>
</tr>
<tr>
<td>85102</td>
<td>2.02</td>
<td>2.41</td>
<td>LEATHER FOOTWEAR AND SNEAKERS</td>
</tr>
<tr>
<td>78210</td>
<td>5.63</td>
<td>2.35</td>
<td>TRUCKS, TRACTORS W/WO TRAILER GASOLINE OR DIESEL</td>
</tr>
<tr>
<td>7111</td>
<td>5.31</td>
<td>2.33</td>
<td>COFFEE, CRUDE</td>
</tr>
</tbody>
</table>

#### Period 1990-2001

<table>
<thead>
<tr>
<th>SITC-5</th>
<th>Sigma</th>
<th>Average Share (in %)</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>78100</td>
<td>4.51</td>
<td>18.59</td>
<td>MOTOR CARS &amp; OTH MOTOR VEHICLES</td>
</tr>
<tr>
<td>33300</td>
<td>7.24</td>
<td>15.38</td>
<td>CRUDE OIL FROM PETROLEUM OR BITUMINOUS MINERALS</td>
</tr>
<tr>
<td>93100</td>
<td>3.06</td>
<td>5.54</td>
<td>SPECIAL TRANSACTIONS AND COMMODITIES NOT CLASSIFIED ACCORDING TO KIND</td>
</tr>
<tr>
<td>77640</td>
<td>1.84</td>
<td>4.16</td>
<td>ELECTRONIC INTEGRATED CIRCUITS &amp; MICROASSEMBLIES</td>
</tr>
<tr>
<td>78400</td>
<td>2.68</td>
<td>3.40</td>
<td>PARTS AND ACCESSORIES OF MOTOR VEHICLES, ETC</td>
</tr>
<tr>
<td>78210</td>
<td>9.83</td>
<td>3.16</td>
<td>MOTOR VEHICLES FOR THE TRANSPORT OF GOODS</td>
</tr>
<tr>
<td>75270</td>
<td>5.89</td>
<td>2.52</td>
<td>STORAGE UNITS FOR DATA PROCESSING SYSTEMS</td>
</tr>
<tr>
<td>75260</td>
<td>4.29</td>
<td>2.36</td>
<td>INPUT OR OUTPUT UNITS FOR DATA PROCESSING SYSTEMS</td>
</tr>
<tr>
<td>85120</td>
<td>3.41</td>
<td>2.04</td>
<td>SPORTS FOOTWEAR</td>
</tr>
<tr>
<td>34140</td>
<td>3.89</td>
<td>1.75</td>
<td>TUNA, SKIPJACK/STRIPE-BELLIED BONITO FR EX LVR/ROE</td>
</tr>
</tbody>
</table>

Notes: SITC-5 Revision 2 (Revision 3) codes are used for the period 1972-1988 (1990-2001). Shares are simple averages of start and end years. Also see notes from Table 5.