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ANALYSIS OF GLOBAL TRENDS IN APPARENT COTTON CONSUMPTION

Gary A. Raines and Mark A. Messura
Cotton Incorporated
Cary, NC

Abstract

Over the last three decades, the growth in retail consumption of cotton in the United States has been a key driver behind the growth of world mill use of cotton. Emulating this domestic success of increased retail consumption internationally is seen as a key method in increasing the worldwide demand for cotton. This study analyzes the per capita economic activity, cotton production, and mill use of cotton of several key foreign markets and compares these variables against the levels of per capita fiber consumption in these markets in order to better understand their effects on per capita fiber consumption at different levels of economic activity, production, and cotton consumption.

Introduction

Growth in world mill use of cotton in recent years has been driven by the growth of retail demand for cotton textile and apparel products in the United States. Per capita retail demand for cotton over the last fourteen years has expanded from 23.6 pounds to a record 35.1 pounds, reflecting the U.S. consumers' ongoing affinity for cotton goods. In addition to maintaining cotton's strong presence in the U.S. market, the potential for future substantial gains in world consumption of cotton also may lie in increased retail demand for cotton in foreign markets, where cotton share and per capita retail consumption may not be as high.

This paper analyzes levels of retail per capita consumption of total textile fibers and of cotton across countries and over time against different exogenous independent variables to better understand the dynamic nature of these interrelationships. These variables include gross domestic product (GDP), cotton production, and mill consumption of cotton. Gross domestic product, the total value of all goods and services produced within a country, is used as a proxy of national income. It is hoped this study can yield insight into trends in fiber share, global shifts in retail textile consumption, and ultimately implications for promotional activities in select foreign markets.

Methodology

Calculating accurate and reliable estimates for international retail consumption of textile fibers, including cotton, can be a daunting and resource-intensive task. Fortunately, the Food and Agricultural Organization of the United Nations, along with the International Cotton Advisory Committee, compile data through their joint *World Apparel Fiber Consumption Survey*. The current FAO/ICAC survey covers 92% of world end-use of textile fibers and 97% of world mill consumption of textile fibers, based on estimates from the ICAC. The gauge used as a proxy for retail demand for fibers is referred to as "home use". To arrive at estimates of the volume of fibers available for home use in individual countries, mill consumption, defined as the volume of fiber utilized by industry, was taken as the starting point. The balance of foreign trade (imports minus exports) in processed textile and apparel products was converted to raw fiber equivalents, and then added to mill consumption. The term "available for home use" is used in preference to "domestic consumption" or "retail use", since no account can be taken of changes in stocks of semi-manufactures and end-products at various stages of processing and distribution, statistics of which are not available. For simplification, "total fibers available for home use" and "cotton available for home use" will be referred to as TFAHU and CAHU, respectively.

Models were constructed to test the relationships of the two dependent variables, total fiber available for home use (TFAHU) and cotton available for home use (CAHU), against several independent variables over time and by country. Conventional wisdom says economic expansion raises all ships. That is, an economy with a larger (or expanding) GDP should have (ceteris paribus) larger (or expanding) home use of textile fibers, including cotton. As an economy's consumers and workers buy and produce more goods and services, demand for textiles, as a normal good, should rise accordingly. In our model, the per capita level of TFAHU was positively related to the per capita level of GDP, confirming this supposition. In 2000, the most recent year available, fully 64% of the variation between countries in per capita TFAHU can be explained by the change in per capita GDP (converted to chained

1995 U.S. dollars at market exchange rates). Additionally, for every $1,000 increase (decrease) in per capita real GDP between countries, per capita TFAHU increased (declined) by 0.5737 kilograms. A linear trend line shows the aggregated world "average" relationship between the two variables across all countries studied (figure 1). Countries below (above) the trend line have lower (higher) levels of TFAHU, given their per capita GDP levels, than does the world average. Of the twelve countries below the trend line with per capita GDP greater than $20,000, ten of these are in Europe.

When the data points were segregated into developed versus lesser developed economies, the two sets conformed to separate patterns and trend lines. When focusing on the twenty-five largest economies, the trend line is still positive, but the slope declines appreciably from the line seen for the world as a whole. 45% of the variation in TFAHU can be explained by the change in per capita real GDP. Also, for every $1,000 increase (decrease) in per capita real GDP, per capita TFAHU increased (declined) by 0.3746 kilograms, a lesser rate than noted for the entire world, implying that developed countries do not see as fast a growth rate in TFAHU as does the entire world. Accordingly, when overlaying the data points for lesser developed economies, the new trend line is clearly steeper, implying that increasing income for countries with lower per capita real income has a greater effect on per capita total fiber consumption than countries with higher per capita income (figure 2). For the lesser developed countries (LDCs), for every $1,000 increase (decrease) in per capita real GDP, per capita TFAHU increases (declines) by 0.4483 kilograms. The coefficient of determination is lower (R-squared equals 0.22) and has a lower standard error than that seen with the developed economies, implying factors besides GDP may be contributing to the variation in TFAHU in larger economies.

Next, the per capita level of cotton available for home use (CAHU) between countries was compared to real GDP levels to verify if cotton use follows similar patterns seen with total fiber use. In a scatter plot of the data, a linear trend line confirms this direct relationship (figure 3). 66% of the variation in per capita CAHU can be explained by the change in per capita real GDP. For every $1,000 increase (decrease) in per capita real GDP, per capita CAHU increased (declined) by 0.2433 kilograms. Similar to the case for TFAHU, the trend line also represents an unweighted "average" relationship between countries between per capita levels of GDP and CAHU at each level of GDP. Countries below the trend line have lower levels of per capita CAHU, given their per capita income levels, than does the world average. Of the eleven countries with per capita real GDP greater than $20,000 that are below the trend line, nine of these eleven again are in found Europe.

When focusing on the twenty-five largest economies, the trend line is still positive and the R-squared is comparable to levels seen for the world as a whole, but the slope declines somewhat, suggesting the effect of higher per capita GDP on per capita cotton use is not as great. 69% of the variation in per capita CAHU can be explained by the change in per capita real GDP (figure 4). For every $1,000 increase (decrease) in per capita real GDP, per capita CAHU increases (declines) by 0.1956 kilograms, a lesser rate than noted for the entire world. This pattern emulates the pattern seen in the comparison of per capita levels of TFAHU and real GDP across countries. Accordingly, when the data points for LDCs were compared to data points for developed countries, two distinct patterns again emerged. The data points and trend line for the LDCs were somewhat steeper, implying that increasing income for countries with lower per capita income has a greater effect on per capita cotton consumption than countries with higher per capita income. For the LDCs, for every $1,000 increase (decrease) in per capita real GDP, per capita CAHU increases (declines) by 0.286 kilograms. At 0.57, the R-squared was not as strong, implying other factors besides GDP may be contributing to the variation in per capita CAHU between countries.

Next, per capita CAHU was compared against levels of mill consumption of cotton between countries. Figure 5 shows little visual evidence of a relationship between per capita CAHU and mill consumption. Similarly, a plot of the annualized percent change in per capita CAHU vs. the annualized percent change in mill use of cotton from 1992 – 2000 shows little correlation, with slope statistically insignificant from zero (coefficient 0.04, std. error = 0.035, p-value = 0.256, figure 6). This fact implies that the growth or decline in mill consumption in a particular country has little bearing on the growth or decline in per capita CAHU under the period studied.

Finally, per capita CAHU was compared against levels of cotton production between countries. Figure 7 shows little visual evidence of a relationship between per capita CAHU and production of cotton. Similarly, a plot of the annualized percent change in per capita CAHU vs. the annualized percent change in cotton production from 1992 – 2000 shows little correlation, with slope statistically insignificant from zero (figure 8). This fact implies that

the growth or decline in cotton production in a particular country has little bearing on the growth or decline in per capita CAHU under the period studied.

Conclusions

This analysis studies the interrelationships of per capita levels of total fiber available for home use and cotton available for home use against the degree of economic development between counties, and against the volume of cotton production and mill consumption between counties. The data show the per capita levels of TFAHU and CAHU are significantly positively related to per capita real GDP between countries. Additionally, the relationships for both dependent variables appear stronger in developing economies and weaker in more developed economies. When compared against levels of cotton production and mill consumption, there was little evidence to suggest a significant relationship exists against either independent variable.

This analysis suggests the potential for growth in per capita CAHU, used as a proxy for retail consumption for cotton, is greatest relative to income in developing economies. Several factors contribute to this finding. First, annual population growth remains appreciably faster in the LDCs than in the twenty-five largest economies, and IMF projections indicate this trend will continue at least through 2050. By having a faster-growing population, the pool of available consumers in an LDC could similarly be expected to grow at a faster rate than the growth rate of consumers in a more developed economy. Secondly, the market saturation of alternative fibers remains less pronounced in LDCs. While this could invite future competition from the introduction of competitive fibers, in the meantime the lack of fiber diversity in several LDCs limits the competitive threat faced by cotton, suggesting per capita CAFU relative to per capita GDP may be higher in LDCs. Finally, consumers' prioritization of needs versus wants is more evident in LDCs. That is, the hierarchy of needs – food, clothing, shelter – implies consumers with less discretionary income will allocate a greater share of their income to acquire these basic necessities before spending on other goods and services. Accordingly, per capita CAHU could reasonably expect to be higher relative to per capita GDP in LDCs for this reason.

One major caveat in this analysis regards the assumption of a developed retail and promotional infrastructure in LDCs versus in developed economies. Promotional efforts for cotton are dependent on a viable infrastructure and a sound, developed retail environment to encourage consumers' awareness of, affinity to, and acquisition of cotton textile and apparel products. The nature of retail infrastructures in many LDCs may challenge the efficiency of conventional promotional efforts.

Finally, this analysis shows one cannot necessarily assume that per capita CAHU is positively related to cotton production or mill consumption in a country. Therefore, if future shifts occur in cotton production or mill consumption, this does not necessarily imply a concomitant or an eventual shift in the per capita availability for home use of cotton in that country.

References

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International Monetary Fund, Washington, DC December 2003 http://ifs.apdi.net/imf/.

Figures

Figure 1.
Per Capita TFAHU vs. Per Capita GDP

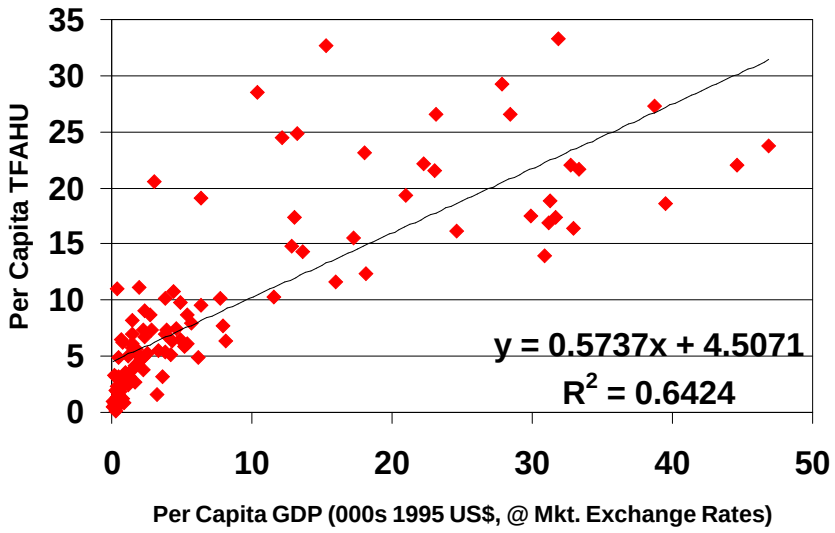

Figure 1. Per capita real GDP versus per capita Total Fiber Available for Home Use.

Figure 2.

Per Capita TFAHU vs. Per Capita GDP

red: developed countries blue: LDC

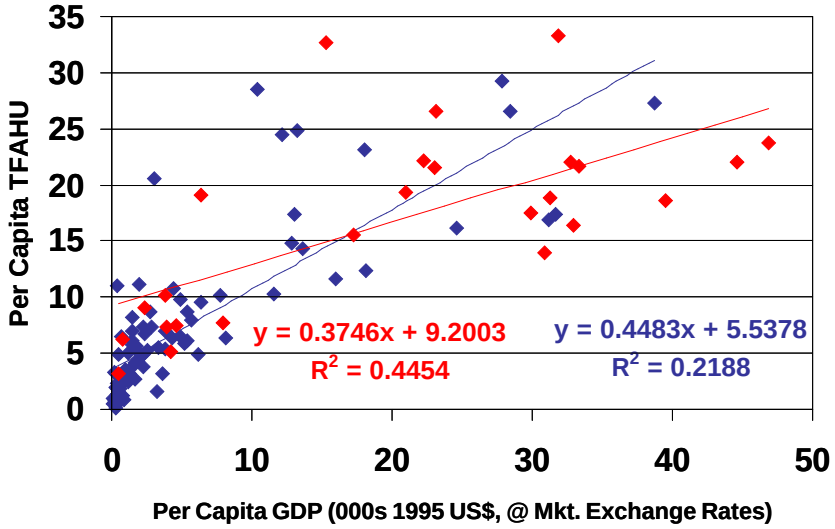

Figure 2. Per capita real GDP versus per capita Total Fiber Available for Home Use, LDCs vs. developed economies.

Figure 3.

Per Capita CAHU vs. Per Capita GDP

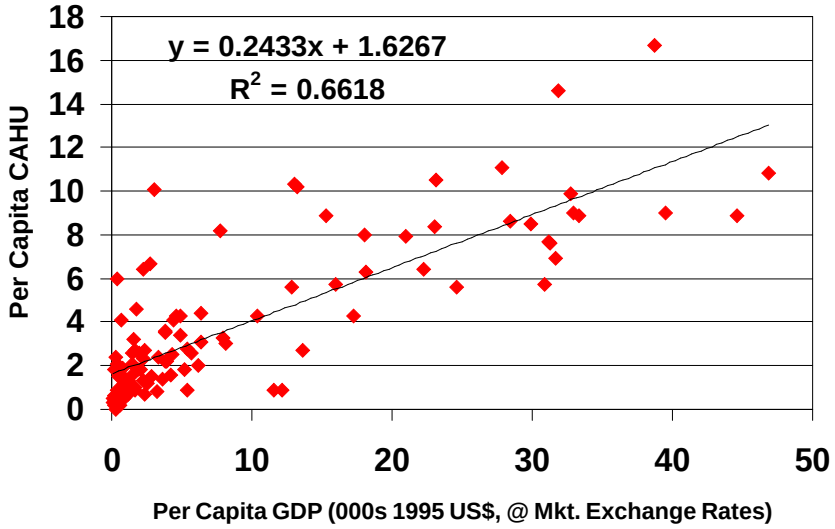

Figure 3. Per capita real GDP versus per capita Cotton Available for Home Use.

Figure 4.
Per Capita CAHU vs. Per Capita GDP

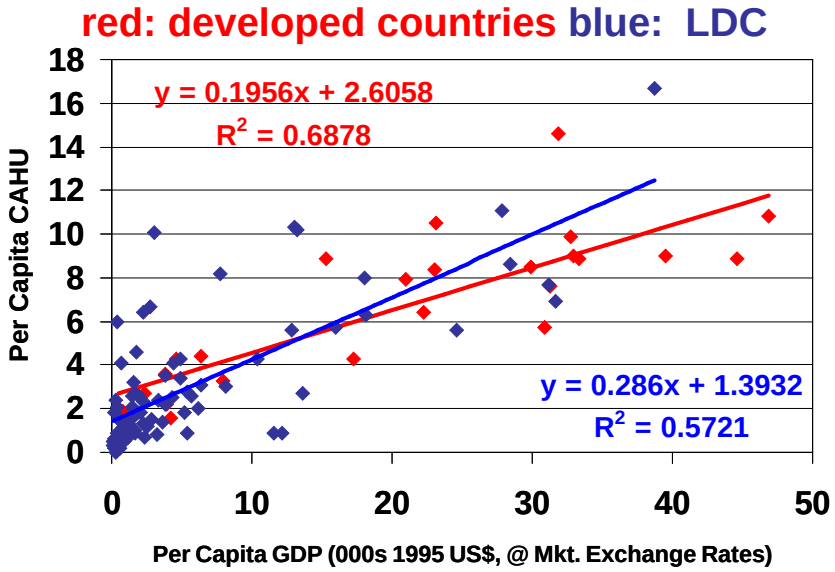

Figure 4. Per capita real GDP versus per capita Cotton Available for Home Use, LDCs vs. developed economies.

Figure 5.
Per Capita CAHU vs. Mill Consumption: Top 25 Mill Consumers

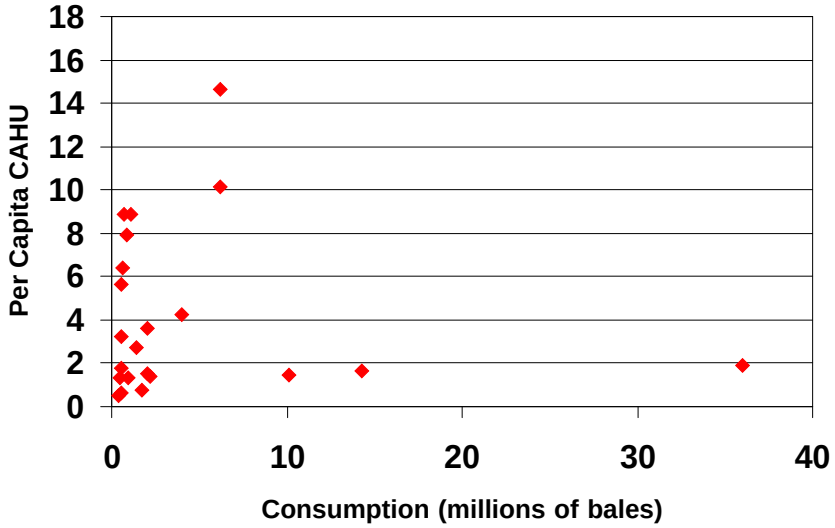

Figure 5. Per capita Cotton Available for Home Use vs. mill consumption of cotton

Figure 6.
Per Capita CAHU vs. Mill Consumption
Annual % Change from 1992 - 2000

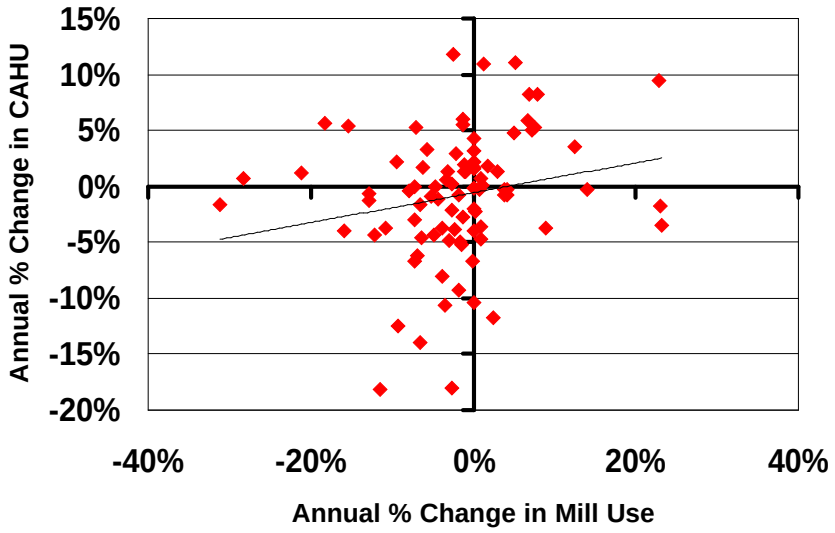

Figure 6. Annualized percent change in per capita Cotton Available for Home Use vs. annualized percent change in mill consumption of cotton between countries.

Figure 7.
Per Capita CAHU vs. Cotton Production

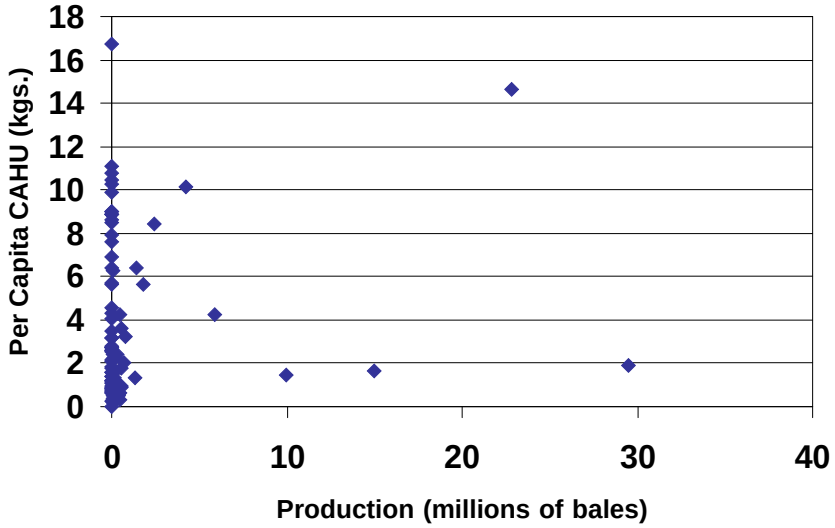

Figure 7. Per capita Cotton Available for Home Use vs. cotton production between counties.

Figure 8.
Per Capita CAHU vs. Cotton Production
Annual % Change from 1992 - 2000

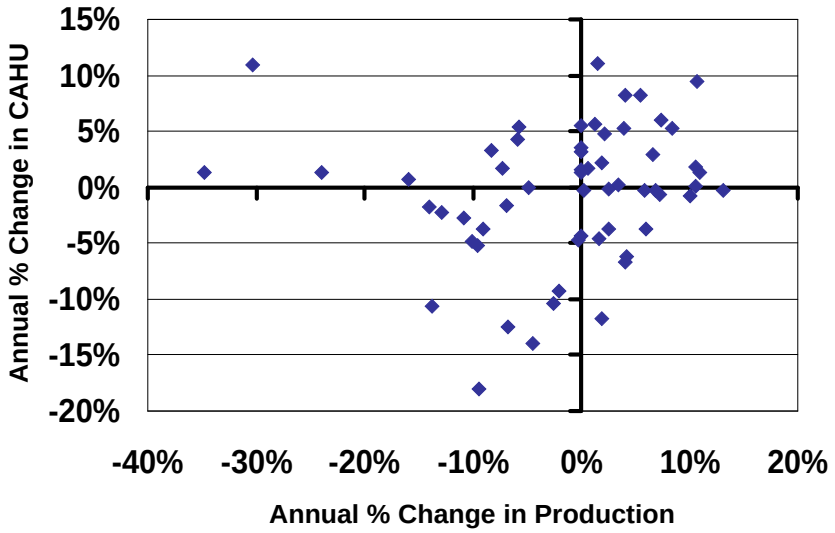

Figure 8. Annualized percent change in per capita Cotton Available for Home Use vs. annualized percent change in cotton production between countries.