AN EXPLORATION OF U.S. END-USE COTTON CONSUMPTION

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Introduction

The world cotton market experienced a series of demand-side shocks in recent years. The first of these resulted from the global recession of 2009/09, which caused consumers to restrain spending and become increasingly value-focused. In turn, the reduction on consumer spending, led retailers to pull back on order volume and to look into possibilities for reducing sourcing costs. The second shock was specific to the cotton supply chain and originated from the spike in fiber prices that occurred in 2010/11. This shock could be assumed to have resulted in a loss in market share to competing fibers like polyester and viscose while amplifying the drive to reduce sourcing costs from the recession. In combination, these two shocks could be seen as pulling U.S. end-use cotton consumption lower. The loss, as reported by the USDA's Cotton and Wool Outlook, indicates that the bale equivalence of U.S. cotton apparel imports were 22.2% lower than they averaged between 2006 and 2007 and that the bale equivalence of cotton home furnishing imports was 16.0% lower (Figure 1).

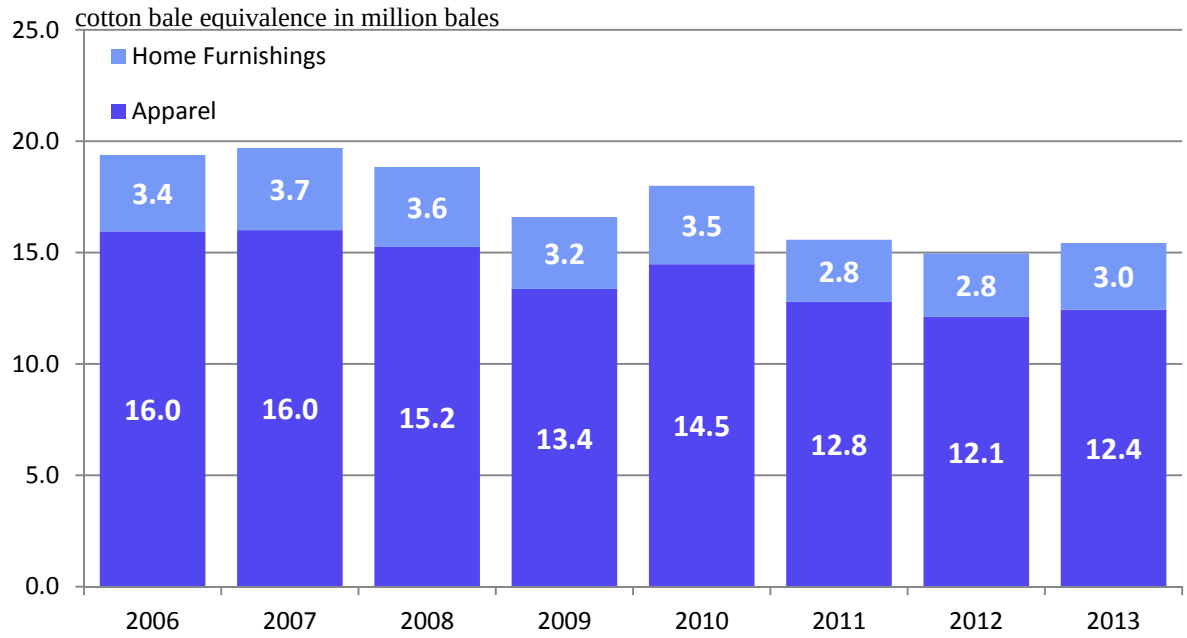

Figure 1. Cotton Bale Equivalence of U.S. Textile and Apparel Imports (USDA Economic Research Service).

To better understand the nature of the effects of these two shocks on end-use cotton consumption, a new database derived from U.S. import data was developed. Relative to existing import databases that have been heavily used to examine apparel imports, and which were largely based on unit counts, a key addition in this new database is that it contains information regarding import weight. For discussion of end-use demand, weight, rather than unit counts, may be more appropriate since average product/unit weights can change over time. Given the dual demand shocks experienced in recent years, the assumption of constant product weight may not be reasonable.

The data included in the database are all accessed from the International Trade Commission (ITC) and the core data attributes are overall weight, unit count, and customs value for the known range of textile and apparel import product categories. The weight data can be used directly to examine the relative importance of various product categories for end-use consumption in the U.S.

These findings can be extended by deriving additional attributes. An example is average product weight (e.g., the total weight for imports in a particular category divided by the unit count). Examination of average product weights

can be used to identify the product categories that were most vulnerable to declines in fiber content with the demand shocks in recent years. In turn, this information could be to target the product categories where the bale equivalence of end-use might be increased.

This paper is organized in the following manner. First, an overview of import classification is presented. The purpose of this section is to provide context regarding the motivation for the creation of the new database as well as an overview of the product categories that are contained within it.

Import Classification

Imports can be classified according to a range of different systems. However, at the base of most of the classification schemes used by governments around the world is the Harmonized System (HS). The HS was developed by the World Customs Organization (WCO), an independent organization with membership derived from more than 170 countries, and began implementation in 1988 (World Customs Organization).

The HS is organized according to codes, which represent product categories. Longer codes, or codes containing additional digits, denote additional precision. There are 96 categories at the most aggregated level, known as chapters, which have two-digit codes. The most relevant chapters for textile and apparel imports are 61 (knit apparel), 62 (woven apparel), and 63 (other made-up textiles, which includes home textiles).

More detailed product categories are defined by four and six-digit codes. Although the WCO does not maintain a common set of codes for classification beyond the six-digit level, it is not uncommon for countries to have codes that classify imports with greater precision. These more detailed codes can be used to better target specific items for specific tariff rates. One country that classifies imports beyond the six-digit level is the U.S. In the U.S., imports are also classified to the eight and ten-digit levels. To illustrate, an example based on women's jeans (ten-digit HS category) is presented in Table 1.

Table 1. Illustration of the Hierarchal HS Import Classification System – Women's Cotton-Dominant T-Shirts

HS Code	Category Description
61	Knit Apparel
6109	T-Shirts, Singlets, Tank Tops and Similar Garments, Knitted or Crocheted
610990	T-Shirts, Singlets, Tank Tops and Similar Garments, of Textile Materials Not Elsewhere Specified or Indicated, Knitted or Crocheted
6109100040	Women's Cotton T-Shirts, Knitted or Crocheted, Except Underwear

An alternate classification system, which is based on HS classification, was developed to enforce quotas. With respect to the U.S., two systems limited imports in recent history. The first was the Multi-Fiber Arrangement (MFA), which was used from 1974 to 1994. The second was the Agreement on Textiles and Clothing (ATC) that was adopted in 1995. Both were negotiated as WTO settlements that allowed for progressively lower trade barriers, and therefore successively higher import volumes, for textile and apparel goods (Tan, 2005). In order to apply the quotas, a unit of measure was required. The unit of measure that was applied in the U.S. was square-meter equivalence (SME).

SME could function as a unit to enforce quotas because SME could facilitate aggregation across product categories. To derive the SME of imports for various categories, a series of conversion factors were developed. These conversion factors are a function of unit volumes. For example, to derive the SME for Women's and Girls' Knit Shirts, one would multiple the unit volume brought into the U.S. by 0.5 (the conversion factor is 6.0 SME/dozen knit shirts).

The quantitative limits imposed by the MFA and ATC were applied to categories that were more general than those determined by the HS system. To illustrate, umbrella thresholds (in terms of SME volume) were applied to the larger categories such as the Cotton-Dominant Women's and Girls' Knit Shirts aggregation rather than having a series of individual limits specified for Women's T-Shirts, Girls' T-Shirts, etc. While the development of these aggregated categories provided benefits in terms of managing quotas, they also assisted researchers investigating end-use consumption by describing imports in terms that allowed for analysis of broad apparel categories. For analyses of fiber share, these categories were particularly useful since they were organized according to dominant

fiber type (fiber that makes up more than 50% of the product's weight). To provide an example of how the MFA categories are derived from ten-digit HS codes, the composition in terms of ten-digit HS codes of the MFA category for Women's and Girls' Knit Shirts appears below.

Table 2. Composition of MFA Category for Women's and Girls' Knit Shirts (ten-digit HS codes)

HS Code	HS Category Description
6104.22.0060	W&G Ensembles of Blouses, Shirts, Tops of Cotton, Knit
6104.29.2049	W&G Ensembles Blouses of Other Textile Materials Subject to Cotton Restraints, Knit
6106.10.0010	Women's Blouses and Shirts of Cotton, Knit
6106.10.0030	Girls' Blouses Not Elsewhere Specified or Indicated (NESOI) of Cotton, Knit
6106.90.2510	W&G Blouses of Silk Subject Cotton Restraints, Knit
6106.90.3010	W&G Blouses of Other Textile Material Subject to Cotton Restraints, Knit
6109.10.0040	Women's T-Shirts Except Underwear of Cotton, Knit
6109.10.0045	Girls' T-Shirts Except Underwear of Cotton, Knit
6109.10.0060	Women's Tank Tops Except Underwear of Cotton, Knit
6109.10.0065	Girls' Tank Tops Except Underwear of Cotton, Knit
6109.10.0070	W&G Articles Similar to T-Shirts & Tank Tops of Cotton, Knit
6110.20.1031	W&G Pullovers Etc. Cotton Knit to Shape 36% Flax Fiber
6110.20.1033	W&G Pullovers Etc. Cotton >=36% Flax Fibers Not Elsewhere Specified or Indicated
6110.20.2045	W&G Sweatshirts of Other Cotton, Knit
6110.20.2077	W&G Pullovers Cotton Knit to Shape < 36% Flax Fibers
6110.20.2079	W&G Pullovers OF Cotton, < 36% Flax Fibers, NESOI
6110.90.9071	W&G Pullovers Knit to Shape Subject to Cotton Restraints NESOI
6110.90.9073	W&G Pullovers Subject to Cotton Restraints Knit NESOI
6112.11.0040	W&G Shirts for Track Suits of Cotton, Knit
6114.20.0010	Women's or Girls' Tops of Cotton, Knitted or Crocheted
6117.90.9020	Parts of Blouses and Shirts of Cotton, Knit

Note: W&G indicates women's and girls'.

Even though all quantitative limits applied to U.S. textile and apparel imports expired in December 2008, trade data continue to be reported in terms of SME and can be readily accessed from the Department of Commerce's Office of Textile and Apparel (OTEXA) website. A particular benefit of the OTEXA site is that data are reported in terms of both HS codes and in aggregated MFA categories. These data have been important in recent years since they have enabled research regarding the effects of the recession and 2010/11 spike in fiber prices on import volumes and cotton's share.

While these data are valuable, it is noteworthy that they are all expressed in terms of unit counts. When conducting analyses of end-use, it likely would be more appropriate to use data expressed in terms of weight. Data in weight terms allow for a more direct link to raw fiber, since raw fiber production and consumption are often expressed in terms of weight (i.e., 480lb bales or metric tons), and since the average product weights may change over time. Given the dual demand shocks in recent years, it may be inappropriate to assume that unit weights remained constant. For these reasons, the new database was developed.

Overview of Database

The database that was developed is based on figures available from the U.S. International Trade Commission (International Trade Commission). A key benefit to this source is that data are available to describe not only unit counts and customs values, as are available from OTEXA, but also weight. These data are all available on monthly terms and coverage extends back to 1996. Figures are available for ten-digit HS codes and the set of codes downloaded are those that are covered by the MFA categories for apparel and made-ups (i.e., home furnishings) displayed on the OTEXA website. In total, this represents more than 2,100 individual import categories (ten-digit HS codes). Although accessed at the specific ten-digit code level, these HS codes were used to create sums for each of the 110 MFA categories (Office of Textiles and Apparel).

Results

The results presented in this section are the latest that were available at the time of the 2014 Beltwide Conferences. Annual data are shown, and since import data are published with a two month lag, the latest available figures are for 2012. Comparisons are made between 2006, the year when the cotton bale equivalence of U.S. imports reached their peak, and 2012.

While the purpose of this article is to introduce the new import database as a tool for examining changes in end-use cotton consumption, it is noteworthy that the results presented represent only a small proportion of the findings that are expected to be supported by the availability to detailed product weight information. A partial list of planned analysis is included in the Future Work & Conclusions section of this paper. Results currently available that are presented in this section are related to average unit weights.

As was discussed in the introductory sections, a limitation of existing databases (at least those accessed by Cotton Incorporated) relative to imports is that they described the import market in terms of SMEs. While SMEs can be appropriate for certain purposes, such as the imposition of quotas on the volume of imports allowed into the U.S., they were no designed to describe end-use fiber consumption. Since SMEs are derived as a function of unit counts, rather than weight, any analysis of end-use consumption based on SMEs involves the implicit assumption that average product weights are constant over time. The new database, which includes weight data, does not need to rely on any such assumptions and make a more direct connection between end-use consumption and demand for raw cotton fiber.

Through the combination of weight and unit count data, average product weights can be derived. Average product weights for 2006 and 2012 are shown in Table 3 for a range of cotton-dominant MFA product categories.

Table 3. Average Product Weights for Cotton-Dominant Product Categories (2006 and 2012)

		Average Product Weight (lbs)		
MFA Code	**MFA Description**	**2006**	**2012**	**Change in Avg. Weight**
330	Handkerchiefs	0.06	0.07	9.7%
331	Gloves & Mittens	0.12	0.12	-4.2%
332	Hosiery	0.10	0.10	-2.9%
333	M&B Suit-Type Coats	1.71	1.48	-13.7%
334	Other M&B Coats	1.75	1.46	-16.2%
335	W&G Coats	1.03	0.99	-4.0%
336	Dresses	0.53	0.48	-8.3%
338	M&B Knit Shirts	0.56	0.46	-18.6%
339	W&G Knit Shirts	0.38	0.33	-12.9%
340	M&B Woven Shirts	0.67	0.64	-4.3%
341	W&G Woven Shirts	0.43	0.42	-1.0%
342	Skirts	0.60	0.44	-27.4%
345	Sweaters	0.96	0.81	-16.3%
347	M&B Bottoms	1.20	1.07	-11.0%
348	W&G Bottoms	0.88	0.72	-18.2%
349	Bras	0.16	0.16	-0.7%
350	Gowns & Robes	0.67	0.50	-25.2%
351	Pajamas	0.67	0.59	-11.7%
352	Underwear	0.18	0.17	-7.0%
359	Other Apparel	0.18	0.18	-0.1%
360	Pillowcases	0.43	0.37	-13.0%
361	Sheets	1.62	1.67	2.9%
362	Bedspreads/Quilts	2.97	3.03	2.1%
363	Terry/Towels	0.71	0.66	-7.0%
369	Other Made-Ups	1.69	1.64	-3.0%

Notes: Data not adjusted for waste. M&B indicates men's and boys'. W&G indicates women's and girls'.

From the results shown in Table 3, it is evident that there were some large declines in certain product categories that are important for total end-use consumption. Particularly alarming are the double-digit decline marked in knit shirts and bottoms for both genders. Continued research will allow for these losses to be expressed in bale terms.

Future Work & Conclusions

This paper serves as an introduction and overview of a newly developed database that can be used to better examine changes in end-use cotton consumption in the U.S. The results presented in this paper represent only the beginning of analysis of that can be supported by the availability of weight data. Despite the preliminary nature of the findings presented, there is evidence of significant reductions in average product weight for a range of key cotton end-use categories. The magnitude of the decreases in average product weights suggest that the decline in end-use consumption due to a lightening of material may have been a more important factor than the loss in cotton's market share. Further investigation into the relative importance of product weight and market share is underway.

Another focus of future work will be the merger of import database with other data sources. Among these is the set of conversion factors maintained by the USDA ERS. These conversion factors translate the weight of finished apparel and textile goods into their raw fiber equivalence, with a key feature being the accommodation for waste. During the spinning process, cotton fiber may be lost as trash or due to short fiber content. Similarly, fiber may be lost in the cut and sew when patterns do not utilize all of the fabric that was purchased. Given the loss in the manufacturing process, the declines in product weight outlined this article should be interpreted as the lower-bound of actual reductions in raw cotton fiber content.

Other efforts are planned to re-organize import data in categories that are commonly requested for market research. For example, there has been interest in estimating the bale equivalence of male and female segments of U.S. apparel

imports. By combining the new database with lists of HS codes that identify products by gender, this would be possible. In a similar manner, the youth segment of the market could be analyzed.

Another expected application for the import database is the comparison of products that have shown the largest decreases in product weights with those that have been demonstrated to suffer from the largest proportion of consumer complaints. Cotton Incorporated has been conducting an analysis of consumer comments on retailer websites. This analysis has been able to detect complaints regarding the cheapness and thinness of fabrics. Since the import database can identify the products that have suffered the largest declines in average product weight, these two data sources could be combined to see how well they might match. This information could be useful for designers and sourcing specialists when they are developing new products.

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