



# The 2012 US Farm Bill and Cotton Subsidies



An assessment of the Stacked Income Protection Plan

By Harry de Gorter, Cornell University



International Centre for Trade  
and Sustainable Development

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## LIST OF ABBREVIATIONS AND ACRONYMS

ACRE	Average Crop Revenue Election
ARC	Agricultural Risk Coverage
CBO	Congressional Budget Office
CCPs	Countercyclical Payments
DPs	Direct Payments
ELAP	Emergency Assistance for Livestock, Honey Bees, & Farm-raised Fish
GRIP	Group Risk Income Protection
LDPs	Loan Deficiency Payments
LIP	Livestock Indemnity Program
LFP	Livestock Forage Program
PLC	Price Loss Protection
RLC	Revenue Loss Protection
SCO	Supplemental Coverage Option
STAX	Stacked Income Protection Plan
SURE	Supplemental Revenue Assistance Payments
TAP	Tree Assistance Program
WTO	World Trade Organization

## FOREWORD

This year marks the tenth anniversary since the US-Brazil Upland Cotton dispute was first filed in the halls of the World Trade Organization. The dispute has drawn attention to payments that American cotton farmers receive and tested the ability of the multilateral system to contend with, in fairness, the grievances of a developing country. Though the final ruling favored Brazil, the requisite changes in American policy have not yet been made. A final resolution to the dispute is a much hoped for outcome for the upcoming US Farm Bill.

The US House of Representatives and the Senate, as we go to press, are contending with two differing proposals on the shape of country's agricultural policy for the coming five years. Given current budgetary pressures and the memory of succeeding years of record farm incomes, there is little appetite for an obviously expansionary set of policies in Washington D.C. Direct payments to farmers, preferred by WTO rules since they are not bound to production or price targets, are slated for cuts while insurance programmes, specific to agricultural commodities, are likely to expand. In this environment, the National Cotton Council has proposed a supplemental insurance scheme for cotton called the "Stacked Income Protection Plan" (STAX). A variation of the proposal has been taken up by each chamber of Congress as a possible solution to the row with Brazil.

Since STAX is a government programme, one that will top off coverage provided under federally subsidized crop insurance, the particulars of its design will determine both fiscal outlays and what and how much American farmers choose to grow. Unsurprisingly, cotton growers elsewhere are also watching to see the sorts of incentives the US Congress will provide to its farmers. International cotton prices have been historically high in recent years and the trade distorting effects of government policy, such as by the US, has not been as important in the past. However, if prices were to fall again, minimum prices in the House proposal for a Farm Bill could buoy US production and hurt some of the poorest farmers in the world. At risk is not only the annual US\$147.3 million provided to Brazil under a framework agreement but also the very real livelihoods of West African farmers.

In a January letter to Congress, Brazil's Ambassador's to the WTO, Roberto Azevedo, made his country's displeasure with STAX and insurance programmes that guard against "shallow losses" clear. He argued that programmes insulating farmers from market forces could not be compliant with WTO rules. Farmers and officials from the Cotton 4 countries also have repeatedly voiced their frustration with US cotton policy over the years. An environment of fiscal accountability may be the appropriate opportunity to resolve the long standing dispute and improve development outcomes elsewhere.

We invite you consider the analysis provided by Harry de Gorter of Cornell University in the pages that follow. Professor de Gorter, a leading agricultural trade expert, has examined the specifics of STAX closely, as well the broad trends emerging in US cotton trade and production. He offers suggestions on how the trade distorting elements of the programme might be minimized and farmers in the US and elsewhere better served.

Sincerely,



Ricardo Meléndez-Ortiz  
Chief Executive, ICTSD

## EXECUTIVE SUMMARY

Although final legislation has not yet passed, both the Senate and House of Representatives versions of the 2012 US farm bill are likely to eliminate direct and countercyclical payments, both deemed trade distorting in the WTO ruling in the US-Brazil Upland Cotton dispute. The marketing loan program is to be maintained, except that the loan rate for cotton has been singled out to decline if market prices fall below it. Indeed, special treatment has been given to cotton in other aspects of the proposed legislation because of the added pressure for reform which we argue has made cotton subsidy programs potentially less distorting compared to both the proposed legislation for other crops and previous cotton subsidy programs.

The Senate and House versions of the 2012 farm bill include a supplemental insurance mechanism specific to cotton, the “Stacked Income Protection Plan” (STAX). The STAX is a revenue insurance program that can be used in combination with the federal crop insurance program. The STAX pays for 70 to 90 percent of losses in farm yields relative to county wide area yield but with a taxpayer subsidy of 80 percent for STAX premiums. Although STAX increases coverage and premium subsidy rates in complementing crop insurance, we show that under certain circumstances, subsidies will not necessarily increase for all farms.

Because of high commodity prices, crop insurance subsidies have increased substantially in recent years. Although not part of the original US-Brazil cotton dispute under the WTO, crop insurance now accounts for 47 percent of total cotton subsidies.

The two proposed bills only differ in that the House version has a minimum price for STAX of \$0.6861 per pound (the current loan rate is \$0.52 per pound). This minimum price has no impact in the high price era of recent years but subsidies and production distortions can increase substantially if we return to lower historical market prices for cotton. The minimum price in the STAX acts like a loan deficiency program embedded in the crop insurance program so we recommend no minimum price be used in the STAX. Nevertheless, the increased STAX subsidy payments under a low market price regime are mostly offset by the decrease in crop insurance subsidies, and we argue that the minimum price in the STAX is likely less coupled than the marketing loan program.

The key question is will the elimination of the direct and countercyclical payment programs along with a reform of the marketing loan rate reduce trade distortions more than the added distortions with the introduction of the STAX? We show there are advantages and disadvantages with the proposed reforms. Elimination of direct and countercyclical payments can have very significant reductions in trade distortions - the trade distorting effects of these programs have been significant in the past. If adopted in the past, our empirical analysis shows the provision that a marketing loan declining with prices would have lowered taxpayer funded loan deficiency payments by one half. Hence, many of the proposed reforms are steps in the right direction and clearly show the United States is serious about cotton subsidy reform.

Nevertheless, the STAX is a coupled payment in that subsidies are based on changes in market revenues with changes in prices and yields and on planted acres instead of base or harvested acres. The proposed legislation for other crops has several undesirable features that the cotton legislation has avoided, such as, updating payment yields and raising support prices above current target prices. Furthermore, cotton has always had the highest share of subsidy programs compared to all other crops, which is unlikely to continue, given the structure of the proposed legislation and the declining competitiveness of US cotton production.

One big advantage for Brazil to accept an agreement with the United States on cotton with the current proposed legislation (with the proviso of no minimum price in the STAX) is that it provides a commitment mechanism whereby Congress will be restrained from legislating additional interventions should a downturn in prices occur in the future.



## 1. INTRODUCTION

Cotton has been one of the most contentious issues in the Doha Round of multilateral negotiations at the World Trade Organization (WTO). Historically, the substantial subsidies provided by the United States to cotton producers were found to artificially depress world prices, undermining the viability of otherwise competitive but unsubsidized producers in the developing world (Jales, 2010; Sumner, 2003).<sup>1</sup> This led Brazil, a country affected by these subsidies, to file and win a dispute at the WTO against the United States, described in greater detail in the paragraphs that follow. A deal struck between the two trading giants required that the United States modify its domestic farm legislation to bring it into compliance with the findings of the dispute panel. American law makers have proposed a supplemental crop insurance program, the Stacked Income Protection Plan (STAX), as a solution to the row.

This study examines the various potential implications of the STAX and compares its trade distorting effects with the reduction in distortion due to the proposed elimination of Direct Payments (DPs) and Counter Cyclical Payments (CCPs).

Both the Senate and House versions modify the marketing loan program. The loan rate is the previous two year average market price with a loan rate minimum of \$0.47 per pound and a maximum of the current loan rate of \$0.52 per pound. The two proposed bills only differ in that the House version has a minimum price for STAX of \$0.6861 per pound (the current loan rate is \$0.52 per pound). The Senate version lacks a minimum price of cotton for STAX for the five year farm bill period. We compare the potential trade distorting effects of these reform

proposals in both the House and Senate versions and compare them to the trade distorting effects of current provisions for cotton in the Food, Conservation, and Energy Act of 2008, referred to as the 2008 Farm Bill in this paper.

In so doing, we will give special emphasis to recent historical trends in US cotton prices, production and subsidies. We will look in particular at the Crop Insurance Program (CIP), which up until now, has not been in dispute between Brazil and the United States. But this may change as STAX, like the Average Crop Revenue Election program (ACRE) before it, can be used in conjunction with the CIP.<sup>2</sup>

The paper is outlined as follows. The next section summarizes the Brazil-US trade dispute, Section 3 describes the current provisions of the 2008 Farm Bill, and Section 4 explains STAX and the reasons for its emergence, while Section 5 compares the proposed cotton subsidy programs to the 2008 Farm Bill. Section 6 analyzes how subsidies under the CIP and the STAX may move in opposite directions moving from a low to high price regime (or vice-versa). Section 7 explains why the House proposal of a minimum price of \$0.6861 in the proposed STAX is not expected to be as trade distorting as the Loan Deficiency Payment (LDP) program, a fully coupled production subsidy. Section 8 shows how cotton prices and profitability have compared to their crop counterparts in this new era of high crop prices while Section 9 examines the historical policy relationship of cotton subsidies to other crops. The final section concludes the paper, including an assessment on the extent to which the programs will alter US cotton farmers' planting decisions and hence impact world market prices and developing countries.

## 2. THE UPLAND COTTON DISPUTE

In 2002 Brazil initiated a dispute settlement case before the WTO over US cotton subsidies and in 2004, a WTO panel found, *among other things*, that the marketing loan and counter-cyclical subsidies in violation of US commitments in the WTO. Although the United States responded with limited reforms, Brazil argued they were inadequate and in 2007, a WTO compliance panel ruled in favor of Brazil which was subsequently upheld on appeal in 2008. The dispute went before a WTO arbitration panel and Brazil announced retaliation in April 2010 based on the arbitration panel's findings. The United States and Brazil immediately reached a temporary settlement agreement whereby Brazil received \$147.3 million in annual payments in exchange for quarterly discussions on changes to US cotton subsidies leading up to "successor legislation to the 2008 Farm Bill" with a view to reaching a mutually agreed solution to the dispute.

To address the dispute and the interests of farmers, both the Senate and House versions

of the 2012 Farm Bill include a proposal from the National Cotton Council for a supplemental insurance mechanism specific to the crop, the "Stacked Income Protection Plan" (STAX), and for reducing the loan rate if market prices fall below it. Furthermore, both the House and Senate versions of the 2012 Farm Bill eliminate direct payments (DPs), countercyclical payments (CCPs) and the Average Crop Revenue Election (ACRE), the latter a revenue insurance program that can be used in some combination with the federal Crop Insurance Program (CIP) but that insures farm revenue at the state level. Taking their place in the commodity title of the proposed 2012 Farm Bills (for cotton only) is the STAX. The key question is will eliminating DPs, CCPs and ACRE and reforming the marketing loan rate while introducing STAX increase or decrease trade distortions? We show there are advantages and disadvantages with the proposed reforms of the US cotton subsidy programs. Hence, assessing the tradeoffs is the key motivation for this study.

### 3. THE CURRENT PROVISIONS FOR COTTON IN THE 2008 FARM BILL

The 2008 Farm Bill provides cotton producers access to marketing loan deficiency payments (LDPs) (which are fully coupled production subsidies),<sup>3</sup> direct payments (DPs) (which are not dependent on prices or production, and so are mostly decoupled), counter-cyclical payments (CCPs) (which are production subsidies that are contingent on market price levels but not on current production, and so are deemed partially decoupled), and average crop revenue election (ACRE) payments (which are very similar to the proposed revenue insurance programs, including that for cotton with the STAX). In addition, many producers may benefit from subsidized crop and revenue insurance available under previous legislation, as well as from new permanent disaster assistance.

Under the 2008 Farm Bill, program participants are given almost complete flexibility in deciding which crops to plant. Farmers are permitted to plant all cropland acreage on the farm to any crop, with some limitations on planting fruits and vegetables on acreage eligible for DPs and CCPs. Eligibility for DPs and CCPs is based on historical production parameters, and no commodity production is required to receive payments, but the land must be kept in agricultural use (which includes fallow). Participants in all programs must comply with certain conservation and wetland provisions.

All current upland cotton production is eligible for the LDPs with the national loan rate set at \$0.52 per pound for crop years 2008-12. DPs are made based on a fixed rate set in the 2008 Farm Act. For producers with eligible historical upland cotton base acreage, the payment rate for upland cotton is set at \$0.0667 per pound for crop years 2008-12. The amount of the direct payment equals the product of the payment rate for the specific crop, a producer's historical payment acres (85 percent of base acres in crop years 2008

and 2012 and 83.3 percent in crop years 2009-11), and a producer's historical payment yield for the farm.

For producers with eligible historical upland cotton base acreage, CCPs are paid whenever the effective price is lower than a commodity's target price. The upland cotton target price is \$0.7125 per pound for crop years 2008-12. The effective price is equal to the sum of (a) the direct payment rate for the commodity, and (b) the higher of the national average farm price for the marketing year or the national loan rate for the commodity. Thus, the minimum effective upland cotton price is \$0.5867 per pound - the sum of the direct payment (\$0.0667 per pound) and the national loan rate (\$0.50 per pound). The maximum payment rate, or the amount used to calculate payouts to farmers for upland cotton, is \$0.1258 per pound. This rate is the target price (\$0.7125 per pound) minus the minimum effective price (\$0.5867 per pound). The payment to farmers equals the product of the payment rate, a producer's historical payment acres (85 percent of base acres), and a producer's historical CCP payment yield which may differ from the DP payment yield because it is calculated using a different historical base year.

Cotton farmers are also eligible for the crop insurance program (CIP) against shocks in yields and prices. Supplemental Agricultural Disaster Assistance, created in the 2008 Farm Act, provides disaster assistance payments to producers.<sup>4</sup> The 2008 Farm Act also allows support for conservation practices on all cultivated land (including fallow). Land retirement programs including Conservation Reserve, Conservation Reserve Enhancement, and the Wetlands Reserve - remove environmentally sensitive land from production and establish long-term, resource conserving cover.

#### 4. WHY STAX, WHY NOW AND HOW DOES IT WORK?

There are three primary motivations for reform in agricultural subsidy programs in general and for US cotton subsidy programs in particular. First, the outstanding cotton dispute with Brazil has put added pressure for reform in cotton subsidies. This is reflected in the special legislation for cotton in the proposed Farm Bills, which we will argue has a cotton subsidy program that is potentially less distorting than for other crops. Second, budgetary pressures in the United States are pushing legislators to change key aspects of agricultural spending in the upcoming 2012 Farm Bill. Third, high commodity prices since 2006/07 have farmers lobbying for policy reform since direct payments are perceived as being politically unpalatable with farm incomes at record levels (Rausser and de Gorter, 2012). At the same time, other mechanisms of supports, such as target prices and loan rates, have been generally ineffective in transferring income to farmers (Dewbre et al., 2001; OECD, 2001; Alston and James, 2002). Hence, the demand for new policy instruments, under the guise of “revenue insurance”, to ensure farmers will continue to receive subsidies in the future (Babcock and Paulson, 2012).

Because of this new era of high commodity prices, total spending by the USDA on programs declined 53 percent between 1999-2005 and 2006-2012. Notably, cotton spending declined by 30 percent over the period in question. The historic highs reached in world cotton prices in March 2011 reduced fully coupled Loan Deficiency Payments (LDPs) and partially coupled CCPs, while mostly decoupled direct payments have held constant. Therefore, total trade distortions have declined. The thrust of this paper will be to weigh the benefits of eliminating DPs and CCPs (and reforming the marketing loan program) against the added distortions with an enhanced CIP which the STAX program, in principle at least, represents.

Both the Senate and House versions of the proposed Farm Bill significantly change farm

programs by eliminating CCPs and DPs while introducing new revenue loss assistance programs.<sup>5</sup> Subsidies under the CIP have increased substantially in recent years. Thanks to high commodity prices the CIP is now the program disbursing the most subsidies in comparison with others. This is because CIP subsidy payouts increase with higher market prices as insurance subsidies are calculated on the basis of unexpected changes in potential total revenue due to any yield and/or price shock. Higher market prices also mean fixed target prices and loan rates do not disburse as many subsidies and so farmers have elected to switch from yield insurance to revenue insurance.

These developments also apply to cotton. Taxpayer financed subsidies for CIP premiums averaged 9 percent of total cotton subsidies from 1999 to 2009 but rose to 47 percent of total cotton subsidies from 2010 to 2012. Furthermore, because target prices are higher for CCPs, LDPs for cotton were one-quarter of that for CCPs in 2005-2009. If current prices return to historical levels, and CCPs are not eliminated and the loan rate not reformed to move down with market prices<sup>6</sup>, then high LDPs and CCPs could return to previously high levels but lower CIP subsidies would be expected.

Revenue loss programs form the cornerstone of the proposed farm bills and cotton is no exception. The specific revenue loss program for cotton is called “STAX” which stands for “Stacked Income Protection Plan” and is for producers of upland cotton where a new section to the Federal Crop Insurance Act is added that provides farmers with an extra revenue loss coverage option. Currently, cotton farmers can participate in the CIP and choose insurance based on their own yields (individual insurance) to a maximum of 85 percent coverage or on county yields (area insurance) with a maximum coverage of 90 percent of expected revenues.

If a farmer chooses insurance based on their own yields and insures up to 70 percent of their

crop, taxpayer subsidies are at a maximum of 80 percent. If the farmer insures up to 85 percent of the value of his crop (the maximum allowed), the taxpayer subsidy declines to 53 percent. Note that a farm can choose either yield or revenue insurance under the CIP, but in recent years, revenue insurance represents 90 percent of total crop insurance taken (Babcock and Paulson, 2012).

Cotton farmers can elect coverage between the individual insurance deductible (of 30 percent, for example) when participating in the CIP and a maximum of 90 percent of expected county revenue when participating in the STAX. The STAX could cover revenue losses of more than 10 percent (the first ten percent of revenue losses are not covered and losses greater than 30 percent would be covered by the traditional CIP). The STAX would require farmers to pay just 20 percent of the premium (80 percent is a taxpayer subsidy), equal to that under the CIP with 70 percent coverage only. The farmer can elect coverage between his individual insurance deductible and 90 percent of expected county revenue. The producer would not necessarily have to purchase coverage in the CIP in order to be eligible for the STAX. If individual insurance is not purchased, STAX coverage can be elected between 70 percent and 90 percent. This enables producers to supplement farm-level revenue insurance to cover “shallow” revenue losses.

The STAX program is intended to make up for losses that are not covered by ordinary crop insurance. The revenue loss proposals are called “shallow loss” programs because they would protect farmers against small losses that are not compensated by the existing CIP, which is designed to cover deeper losses. As we show later, the STAX will complement the CIP only under certain circumstances.

There are three incentives for farmers to participate in the STAX and be better off with both insurance policy options rather than be in the CIP only. First, if individual or traditional area wide coverage under the CIP is not purchased, the coverage elected under

the STAX can be between 70 percent and 90 percent, but have a multiplier of 1.2 instead of a maximum of 1.0 (see the definition of  $\gamma$  in equation (2) below). Second, the STAX payout cannot exceed 20 percent of expected county revenue, restricting total outlays farmers could receive. The latter means there is a cap of 20 percent of expected revenue or 80 percent of expected revenue is not covered. Third, the STAX provides 90 percent coverage (the maximum of area wide insurance under the CIP) but the STAX is at the maximum taxpayer subsidy rate of 80 percent. Recall that farmers who increase their coverage in the CIP to 85 percent of the value of his crop, the taxpayer subsidy rate declines from 80 percent to 53 percent.

The extent to which farmers participate in both programs depends on several factors. Before explaining these factors, let us first consider the typical case where a farmer elects individual revenue insurance under the CIP. Let us take the example of a farmer electing 70 percent individual insurance coverage with a 30 percent deductible under the CIP. This means a crop insurance payment will go to an individual farm if farm level revenue loss is greater than 30 percent:<sup>7</sup>

$$CI^i = A^i \cdot \text{MAX}[P^{\wedge} \cdot 0.7 \cdot Y^{\wedge i} - P \cdot Y^i, 0] \quad (1)$$

where  $A^i$  is planted acres by the individual farm,  $P^{\wedge}$  is the expected market price,  $Y^{\wedge i}$  is the expected yield for the individual farmer,  $P$  is the realized market price and  $Y^i$  is the realized individual farm yield.

Under the STAX (whether the farmer participates in the CIP or not), the payout for an individual farmer is given by:<sup>8</sup>

$$\text{STAX}^i = \gamma \cdot A^i \cdot \text{MAX}[0.9 \cdot P^{\wedge} \cdot Y^{\wedge c} - P \cdot Y^c, 0] \quad (2)$$

where  $\gamma$  is the payment parameter the farmer chooses where  $0.8 \leq \gamma \leq 1$ ,<sup>9</sup>  $Y^{\wedge c}$  is the expected average county yield for the individual farmer and  $Y^c$  is the realized average county yield.<sup>10</sup> The STAX coverage is specified in increments of 5 percent and with a minimum deductible of 10 percent (represented by the 0.9 factor

in equation (2)). But the STAX payout cannot exceed 20 percent of expected county revenue:

$$\text{MAX STAX}^i = 0.2 \cdot A^i \cdot [P^{\wedge} \cdot Y^{\wedge c}] \quad (3)$$

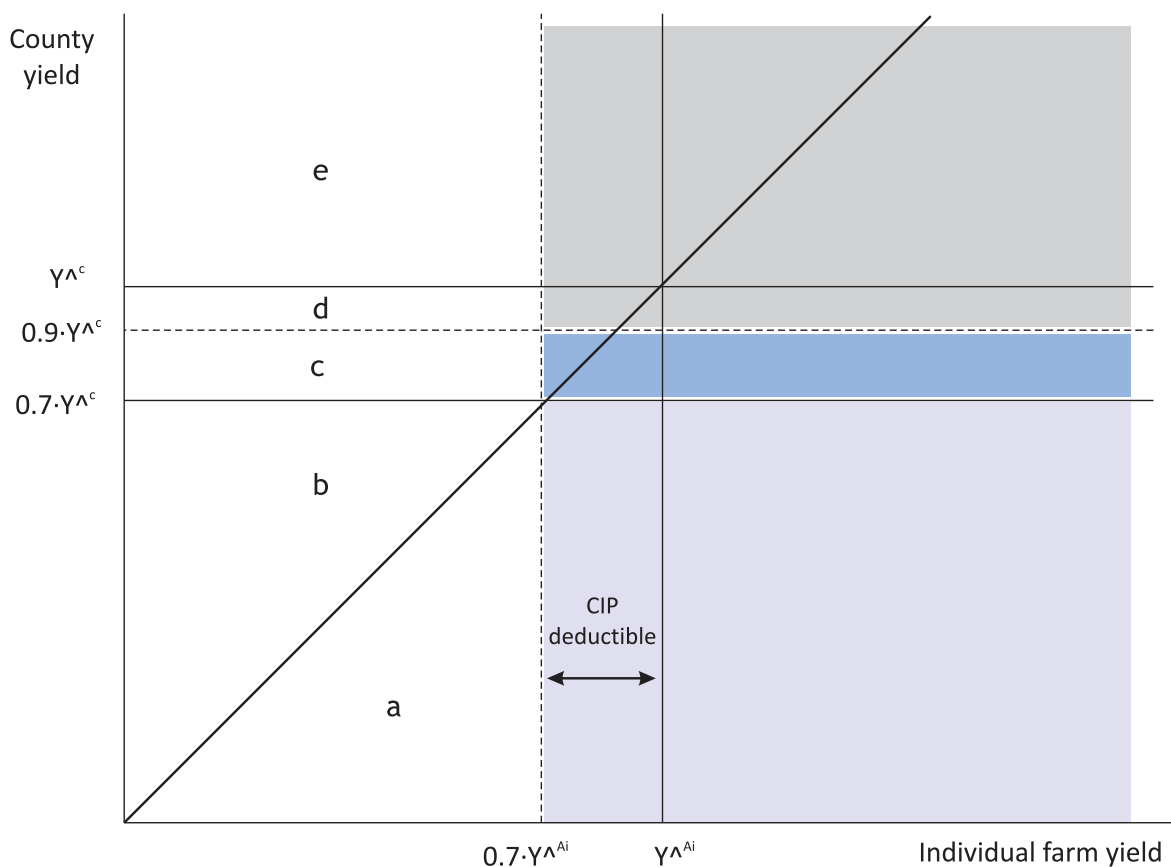
This maximum in equation (3) is likely to be a constraint that gives the farmer an incentive to participate in CIP too.

Now, we are in a position to analyze the extent to which the STAX will increase payouts to farmers above and beyond that of the CIP alone, with a key question being will farmers get compensated more than if there was no STAX? The answer will

depend on the degree of correlation between the individual farm's and county yields or, in other words, the deviation in realized individual farm yields from expected county yield and expected individual farm yields.

Consider Figure 1 where county yields on the vertical axis are plotted against individual farm yields on the horizontal axis (prices are normalized to one as we continue analyzing revenue insurance). The expected average county yield is given by  $Y^{\wedge c}$  and the average expected individual farm yield for all  $i$  farmers ( $i = 1, \dots, n$ ) is  $Y^{\wedge Ai}$  where  $Y^{\wedge c}$  should equal  $Y^{\wedge Ai}$ .

**Figure 1: Possible Payment Zones with the STAX and the CIP**



There is a quadrant of possible outcomes for each individual farmer, depending on where a farmer's realized yield  $Y^{Ai}$  compares to the expected county wide yields  $Y^{Ac}$  and expected average of all individual farm yields  $Y^{Ai}$ . The dividing lines of the quadrant are delineated by the dotted lines in Figure 1. The horizontal dotted line is 0.9 times the average county yield  $Y^{Ac}$  and the vertical dotted line is 0.7 times the average of all individual farm yields  $Y^{Ai}$ . The 45 degree line represents perfect correlation between any individual farm yield and county yields. The N-E quadrant (dotted area) is where no insurance payouts are made. The N-W quadrant (area  $d + e$ ) has a CIP payout but no STAX payout (so maximum coverage for an individual farmer is 70 percent). The S-E quadrant has no CIP payouts but partial STAX payments in the darkly shaded area and maximum STAX payments (the full 90 to 70 percent range of area yield) in the lightly shaded area of the S-E quadrant. Hence, farmers get more payments with the introduction of the STAX than otherwise would have been the case, even if the farmer's option was not to enroll in the STAX and instead elect 85 percent coverage under the individual farm CIP. Finally, in the S-E quadrant, there are CIP payouts and partial STAX payouts if any farm yield falls in area  $c$  and maximum STAX payouts if farm yields fall in area  $a + b$ .

Let us consider the case when the individual farmer's yield is perfectly correlated with the county yield. In that case, the outcome is on the 45 degree line in Figure 1. In the S-E quadrant, the farmer is guaranteed 90 percent coverage  $0.9 \cdot Y^{Ai}$  (not shown on the horizontal axis in Figure 1) except the taxpayer premium subsidy is higher than if under the CIP. This means STAX operates like an extra 20 percent coverage under an individual CIP plan at 70 percent coverage but with a higher subsidy rate.

Any yield outcome for an individual farmer off of the 45 degree line means the farmer's yield is not perfectly correlated with the county yield. If the farmer's yield falls in the N-W direction of the 45 degree line, then the

farmer gets more than he would if his yields were perfectly correlated with county yields - he gets "overcompensated" (and the reverse if his yield falls to the S-E direction of the 45 degree line - he gets "undercompensated").

To summarize, if an individual farmer's yield fell in the N-W and N-E quadrants, the introduction of the STAX will have no effect on payouts compared to the CIP (unless the STAX changes the elected coverage under the CIP). In the S-E quadrant, farmers are definitely better off with the STAX

The STAX complements the CIP if an individual farmer's yield was perfectly correlated with county yields. The farmer would then choose both revenue insurance programs and the STAX because premium subsidies are the same and there would be no overlap or extra coverage - farmers would get 90 percent coverage instead of the 70 percent coverage with the CIP alone. At the same time, there would be no shortfall or holes in coverage up to 90 percent.

Individual yields will seldom be perfectly correlated with county yields so the next question is how will farmers choose different levels of coverage between the CIP and the STAX? The outcome will depend on the degree of correlation between individual and county yields, individual farm yield shocks relative to the expected county and individual farm averages, the risk assessment and profile of the farmer, and so on.

Our analysis shows the STAX becomes an extension of the CIP, itself becoming a large source of subsidy payments in recent years. Farmers will likely take the STAX option in addition to the CIP because of higher taxpayer subsidy rates for higher coverage levels compared to the traditional CIP. The design of STAX therefore warrants scrutiny if the outcomes of the program are not consistent with the intentions of policy makers and end up interacting with the CIP such that subsidy payments are expanded, and higher trade distortions are the result.

*Impact of a Minimum Price in the House version of STAX*

The House version of the STAX has a minimum price of \$0.6861 per pound which will become effective if prices return to those levels in the low price era. The analysis above would have to be augmented where the expected price  $P^{\wedge}$  in equation (2) is replaced with the higher minimum prices in low price years. The STAX program will over-compensate farmers by the difference between the minimum price and the (lower) expected price. Meanwhile, farmers may be obtaining loan deficiency payments as well. Two

constraints for STAX that still exist (maximum 20 percent coverage and maximum 20 percent of expected county revenue) but these constraints are now larger as the binding minimum price is higher than the expected county price that otherwise would have been used to calculate these maximums and so payouts will be larger. So the minimum price in the STAX acts like a loan deficiency program embedded in the crop insurance program, adversely affecting the actuarial fairness of the insurance policy but also double counts subsidies with the LDP program itself. Hence, we recommend no minimum price be used in the STAX program.



## 5. THE ECONOMICS OF STAX VERSUS 2008 PROGRAMS

Because current DPs and CCPs are calculated using fixed base acres and program yields, they are regarded decoupled from farmers' production decisions and hence many argue that they have had minimal impact on farmers' planting decisions. But the distortionary effects of DPs and CCPs have been underestimated (Bhaskar and Beghin, 2009). Furthermore, Chau and de Gorter (2005) and de Gorter et al. (2008) show that cross-subsidization along with exit deterrence can cause more trade distortions than a fully coupled subsidy. In the penultimate section of de Gorter (2009), it is also shown that the planting restrictions on land used for fruit and vegetable crops and for non-cropland can cause significant production distortions, as the WTO also ruled the planting restrictions are distortionary in the US-Brazil Upland Cotton dispute.

STAX program by itself has several avenues that can cause trade distortions, whether cotton farmers participate in the regular CIP or not. If they do participate, the STAX is additive or supplemental to the CIP, with a potential for overlap. The STAX calculates subsidies on the basis of current planted acres, expected market prices and on expected yield per acre but at a county level versus farm level, the latter being an option for farmers participating in the CIP. This represents at least one aspect of the program that maintains some degree of decoupling (Babcock and Paulson 2012). The level of CIP subsidies were not under debate in the WTO trade dispute with Brazil and the United States. We will show in Section 6 that adding the STAX will essentially double the historical average costs of the CIP for cotton farmers (assuming a market price of \$0.71 per pound) and will increase as much again if there is a low price scenario (\$0.473 per pound) in the future with a minimum price in the STAX as proposed in the House legislation. Although the subsidies for CIP have not been a trade issue for cotton, the sharp increase in CIP subsidies for cotton and their doubling with STAX may

make this a trade issue, especially if subsidies increase even more with a low price scenario and the minimum price in the House proposal for the STAX.

The STAX is a coupled payment in that subsidies are based on changes in market revenues with changes in prices and yields.<sup>11</sup> The potential trade distortions caused by the STAX program relative to DPs (so called "decoupled" subsidies) and CCPs (partially decoupled) are complicated. Nevertheless, there is one feature of STAX that does stand out: it is based on planted acres. On the other hand, LDPs are based on harvested acres, while CCPs and DPs are calculated on the basis of fixed "base" acres. Since planted acres are greater than harvested acres and fixed "base" acres are bound to historical assessments, STAX will generally cover the greatest number of acres in the programs discussed above.

The STAX distorts production in that it provides a subsidy that raises the net revenue per acre. The STAX will exacerbate the problems with "moral hazard" where cotton farmers will tend to take on risky production decisions such as land that is susceptible to bad weather or encouraging plowing up environmentally sensitive land and discouraging diversification of cropping systems (Zulauf and Orden, 2012; Babcock, 2012a).

It is important to point out that the proposals for cotton subsidies differ markedly from other crops, primarily because of the WTO cotton dispute and the conditions of the interim United States-Brazil framework agreement. In other words, the proposed STAX for cotton does not have some of the trade distorting features of other programs being proposed for other crops. For example, the House Agricultural Committee's 2012 Farm Bill allows farmers to choose a fixed price support program, referred to as Price Loss Coverage (PLC) which has a similar design to that of the current CCP except potentially far more trade distorting. PLC

would provide payments on planted (rather than base) acres, and PLC reference prices are set above current CCP target prices. In addition, producers will have the option of updating their current CCP payment yields. All of these potential trade distorting features of PLC become irrelevant for cotton.<sup>12</sup> This puts cotton apart from other crop programs, which makes the STAX program alone seemingly less distorting in comparison, not to mention the

added feature of cotton loan rates alone are to decline if cotton market prices decline.

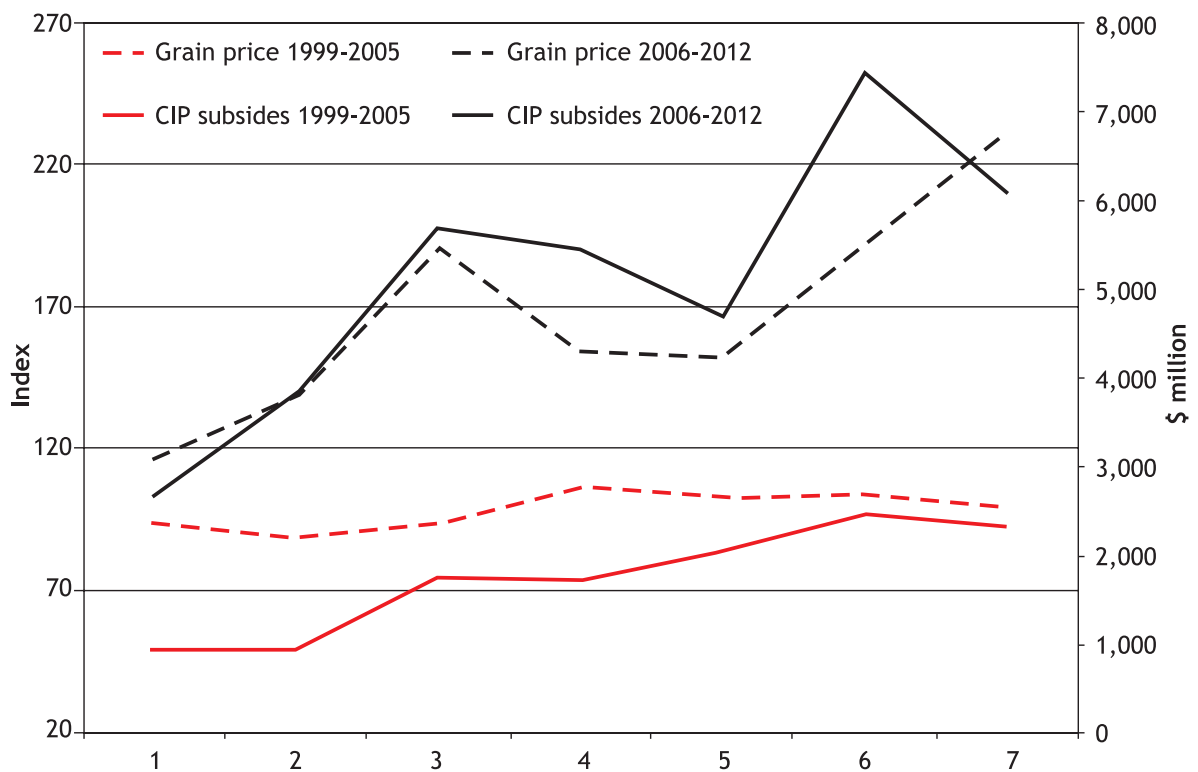
Because the STAX program is very similar in design to ACRE (which cotton producers did not participate in for various reasons mentioned earlier, and is now to be eliminated), it is important to note that Zulauf and Orden (2012) find substantial budget savings with ACRE over LDPs.

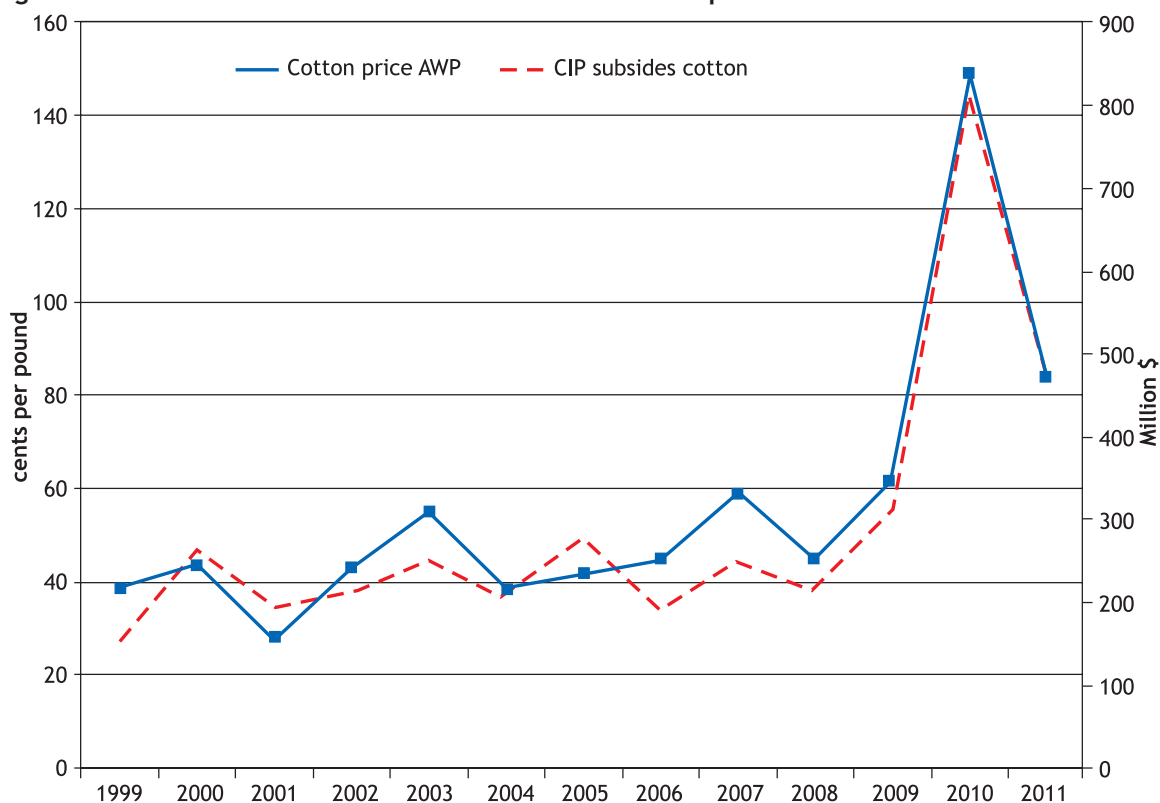
## 6. HOW STAX VERSUS CIP SUBSIDIES CHANGE IN A HIGH VS. LOW MARKET PRICE REGIME

One key result of the CIP is that when market prices of crops surged beginning in 2006, the subsidy cost of CIP went up in this new high market price regime (Babcock 2012a,b; Babcock and Paulsen, 2012; Zulauf and Orden, 2012). This is shown in Figure 2 where a price index for grains is plotted against US CIP subsidies for two time periods: 1999-2005 (the period of time examined by the WTO in the US-Brazil dispute) and the high price era 2006-12.

Clearly, in the high price regime, CIP subsidies are higher because as noted earlier, payouts depend on the differential between expected and realized market revenues. The specific data for cotton is given in Figure 3. Hence, in a high price era, subsidies escalate for a given percent shock in either anticipated yield or price compared to their realized values.

Figure 2: Total Crop Insurance Subsidies to Farmers vs. Grain Price Index



**Figure 3: Cotton Prices vs. Cotton Subsidies under Crop Insurance**

It is important to note that in the interim cotton prices at the international level witnessed the biggest price spike of any crop. The spike in cotton prices was short lived. The fact that other crop prices are expected to remain higher than cotton has implications for what to expect in terms of relative prices and how competitive or not cotton may be in the future versus other crops. One reason cotton prices have come back closer to historical levels compared to other crops, is the massive expansion of cotton production in China and India as a direct consequence of these countries' adoption of biotech cotton (Baffes, 2011). And the new era of high crop prices only trickled down to cotton as there is far less substitutability for cotton relative to other grain and oilseed crops both on the input side in shifting land and other inputs between crops. Inputs for cotton production are very crop specific while there is no substitutability in demand.

#### What if we return to a low price period?

The standard approach taken to determine the subsidy effects of crop insurance programs like the CIP or the STAX is to assume a distribution

of future yields and prices and then estimate the resulting distribution of payments.<sup>13</sup> An average price is assumed - \$0.71 per pound in the case of CBO (2012a,b) and Babcock and Paulson (2012) over the time period 2013-2017 (2022 in the case of CBO 2012a,b). But Babcock and Paulson (2012) also simulate the distribution of the STAX subsidy payments on random draws of price and yield distributions under a low price regime - a market price of \$0.479 per pound on average over the 2013-17 time period, substantially below recent prices.

But because of the very nature of the STAX program, although an add-on to the CIP, the subsidy costs increase (for given shocks in price and yield) when the market is in a low price regime (Babcock and Paulson 2012). So subsidies with the CIP and STAX are higher in a high price regime and lower in a low price regime unless with STAX, the minimum price of \$0.6861 per pound in the House version is maintained. We noted earlier that the CIP subsidies are becoming more important relative to DPs and CCPs in recent years. Furthermore, DPs and CCPs are to be eliminated in both the House and Senate versions of the 2012 Farm

Bill proposal. It is therefore more important to assess the STAX program in relation to the CIP - both are more coupled programs except the STAX program has some degree of decoupling with revenues based on data at the county level.

So the question becomes: how much of the increased STAX subsidy payments under a low market price regime are offset by a decrease in CIP subsidies? To answer this question, we calculate “subsidy price regime flexibility coefficients” for both the STAX and the CIP. A subsidy price regime flexibility coefficient is defined as the percentage change in subsidies with respect to a percent change in prices between the two market price regimes. Ad hoc measures of this coefficient are estimated from available data and the results of other studies.

Such data are presented in Table 1. Average subsidies under the CIP (for cotton and all crops) along with average prices in the two price regimes - the time periods 1995-2005 and 2006-2012 - are presented in the first two rows. The last two columns provide data from the Babcock and Paulson (2012) study - the third row in Table 1 gives data for the low regime scenario for the STAX program with an average price of \$0.479 per pound for 2013-2017. Babcock and Paulson (2012) estimate the STAX program to cost on average \$379.2 mil. (we calculate this number based on 2012 plantings) for the standard forecast price of \$0.71 per pound, the same price forecast used by CBO (2012b). The STAX program subsidies average \$385.1 mil. for 2013-2022 using CBO (2012b) data (compared to \$379.2 mil. reported in Table 1 for the Babcock and Paulson (2012) results).

**Table 1. How STAX and CIP Subsidies move in Opposite Directions in a High vs. Low Price Regime**

	Cotton CIP subsidies \$mil.	All Crop CIP subsidies \$mil.	Market Prices		Babcock data**	
			Cotton \$/pd	All Grain index*	STAX Subsidies \$mill	Cotton price \$/pd
1999-2005 Price Regime	209,3	1754,6	0,457	98,7	-	-
2006-2012 Price Regime	361,5	5129,3	0,654	168,4	379,2	0,71
Babcock (2012c) STAX low Price Regime	-	-	-	-	707,8	0,479
% change	72.7%	192.3%	42.9%	70.5%	86.7%	-32.5%
Subsidy price regime elasticity***	-	-	1.69	2.73	-	-2.67
Subsidy price regime flexibility coefficient***	-	-	-0.64	-1.02	-	0.87
Change in cotton subsidies \$mill	-	-	(229.6)	(369.6)	-	329.1
Net change in cotton subsidies \$mill	-	-	99.5	(40.5)	-	-

Source: calculated

\* 2005 = 100

\*\* average price 2013-17 and planted acres 2012

\*\*\* Values derived from row above it: the value of 1.69 = 72.7/42.9; 2.73 = 192.3/70.5; and -2.67 = -86.7/32.5.

\*\*\* The value of -0.64 = 1.69/0.87. The value of -1.02 = 2.73/0.87. The value of 0.87 = -2.67 times -32.5.

Actual CIP subsidies for cotton averaged \$361.5 mil. in 2006-2012 so the initial level of CIP is about exactly what the forecasted subsidy costs of the STAX program will be. The STAX program represents a doubling of CIP subsidies even though the STAX program is supposed to be a “shallow loss” or “top off” of the CIP for cotton farmers. Furthermore, these programs are supposed to complement each other which they do for a given price regime but we will now show that subsidies could go in the opposite direction with a change in the market price regimes (from low to high or vice-versa).

The fourth row of Table 1 gives the percentage change in subsidies and prices for cotton, all grain and the Babcock and Paulson (2012) study estimate for cotton. From these data, “subsidy price regime elasticity” can be calculated for each scenario. This is defined as the ratio of the percent change in subsidies over the percent change in price between the two regimes. The next row presents the “subsidy price regime flexibility coefficient” (defined earlier as the percentage change in subsidies with respect to a percent change in prices between the high and low price regimes) for the experiment of a 32.5 percent reduction (the experiment undertaken in the Babcock and Paulson (2012) study and given in the fourth row of the last column of Table 1) where each subsidy price regime elasticity is divided by -2.67, the subsidy price regime elasticity for the Babcock and Paulson (2012) study.

This allows us to calculate the change in cotton subsidies for the 32.5 percent reduction in

market prices between regimes as presented by Babcock and Paulson (2012). We see that STAX subsidies increase by \$329.1 mil. as per the Babcock and Paulson (2012) study results. It should be noted that much of this increase in subsidy costs of STAX in moving from a high to low price regime may be due to the minimum price of \$0.6871 per pound that Babcock’s analysis assumes. Hence, removing the minimum price may be sufficient to make STAX a much lower subsidy program than otherwise.

Using the subsidy price regime elasticity for cotton CIP subsidies, the CIP subsidies would decline by \$229.6 mil. and if we apply the all crop subsidy price regime elasticity instead (to calculate the corresponding subsidy price regime flexibility coefficient for the particular scenario under consideration), then the CIP subsidies would decline by \$369.6 mil. The net change in total subsidies related to the CIP and the STAX would be +\$99.5 mil. if we use the cotton subsidy price regime elasticity but a net reduction in cotton subsidies of \$40.5 mil. in the event that the “all crop” CIP subsidy price regime elasticity be more representative.

Hence, the switch in price regimes may not have as big a consequence for total subsidy costs if one looks at the CIP and the STAX together. However, more detailed analysis is warranted along with the possibility that there may be other interaction effects between the two programs. Furthermore, the STAX could increase participation and coverage rates, thereby increasing the subsidies associated with both the CIP and the STAX.

## 7. WHY THE HOUSE MINIMUM PRICE OF \$0.6861 PER POUND DOES NOT ACT LIKE A COUPLED LDP

The analysis above shows that the minimum price of \$0.6871 per pound may be a significant factor in affecting the subsidy level. But even if the minimum price of \$0.6861 in the House version of the STAX program proposal is maintained, it is easy to interpret that it makes the STAX like a fully coupled LDP program. But this is not the case. The STAX does re-couple cotton subsidies (compared to say DPs and CCPs) but initial estimates of the STAX subsidy by CBO (2012 a, b) and Babcock and Paulson (2012) is about equal to the average CIP subsidy for cotton from 2006-12. This period of time falls after what was examined by the WTO in the US-Brazil dispute. The CIP subsidy doubles in effect with the addition of the STAX program even though the latter is only meant to cover “shallow losses”. But as Babcock (2012b) shows, farmers have every incentive to participate in revenue insurance programs like ACRE (which the STAX is very similar to

in design and purpose) to complement their participation in their individual CIP.

The reason the STAX does not act like a fully coupled LDP program is that the payout is based on the difference between expected and realized revenues.<sup>14</sup> Traditional subsidy programs have gone beyond 20 percent of total revenues. Figure 4 shows subsidies have even gone over 100 percent of total revenues for cotton historically so the STAX could be an improvement.

It is difficult for cotton producers to receive the maximum payment of 20 percent of total revenue since the STAX payment is based on the difference between two revenues: expected and realized prices, which do not always go in the same direction as yields (see Figure 5). Figure 5 shows that out of 14 observations, half of the time prices and production move in the same direction including from 2009 to 2012 when prices and CIP payments were high.

Figure 4: Total Cotton Subsidies as a percent of Total Revenue

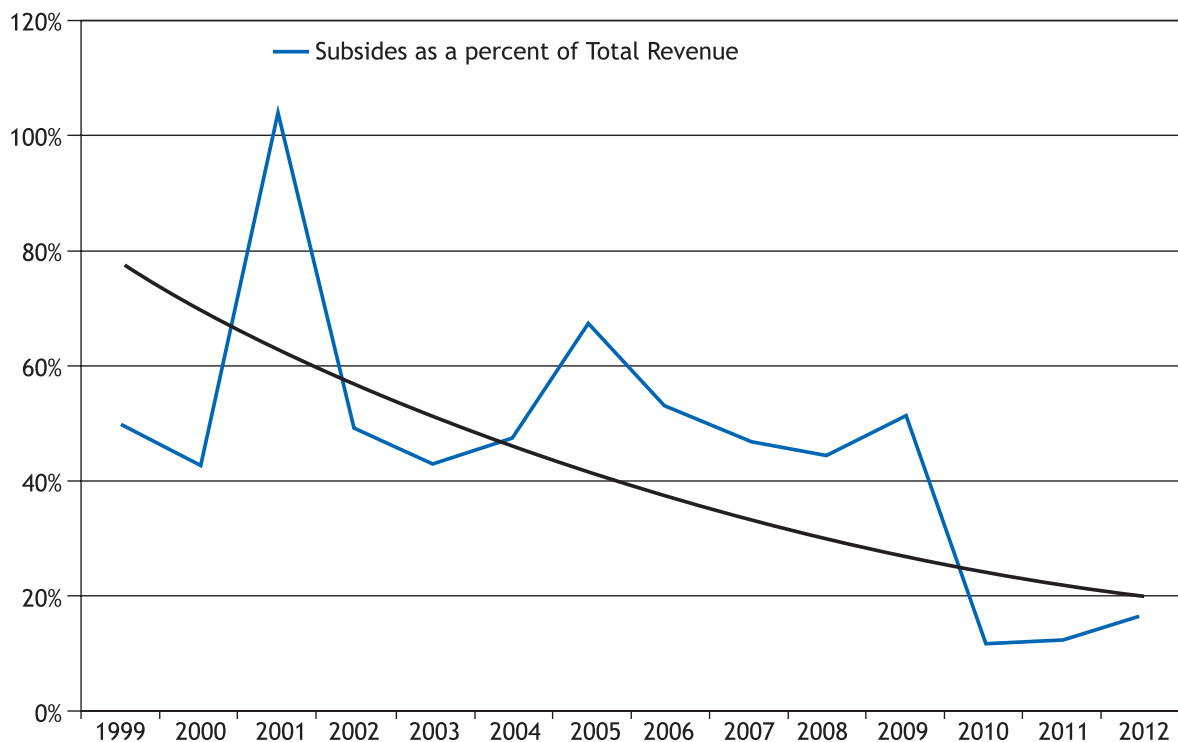
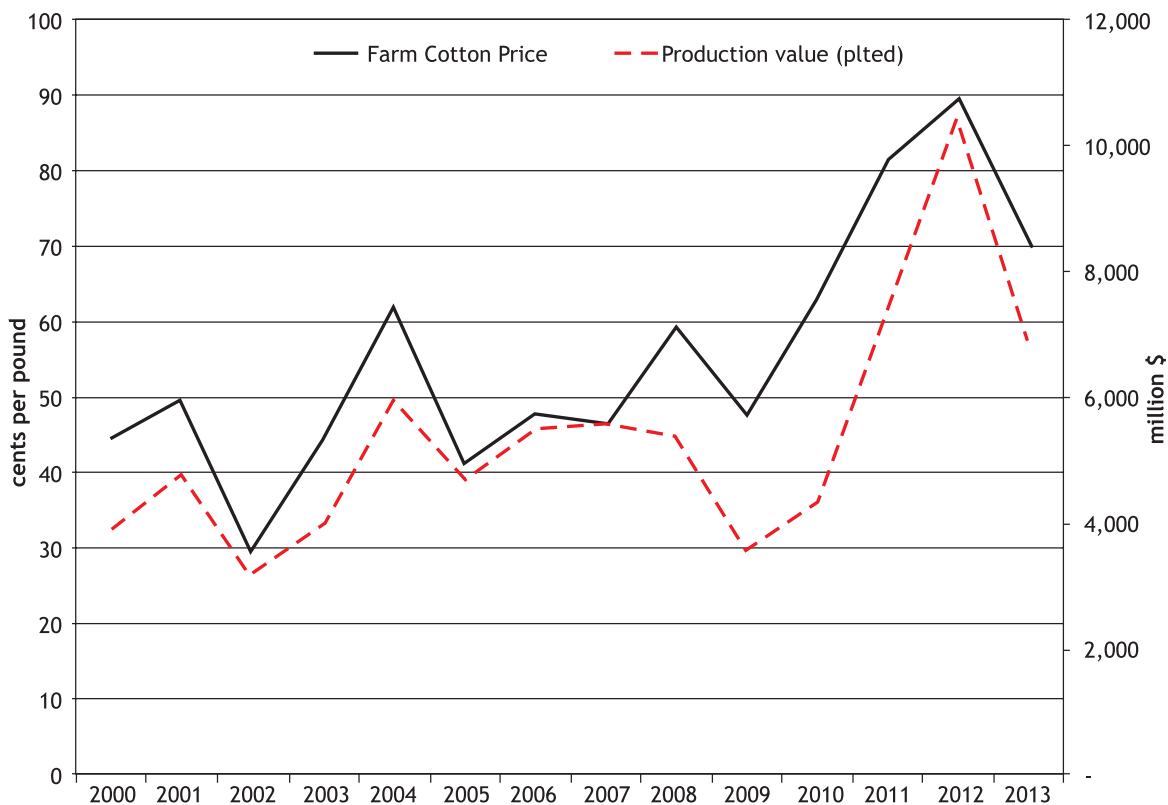


Figure 5: Cotton price vs. Value of Production



So it is very difficult for cotton producers to get to the maximum payment although as Figure 6 shows, the change in total revenues have been very steep for US cotton farmers in the last two years, with CIP subsidies skyrocketing to new highs: \$811.8 mil. and \$468.5 mil. in

2011 and 2012 respectively. In three of the last four years, cotton prices and change in total revenue have gone in the same direction, mainly because of the increase in abandoned acres in the past two years (see Figure 7).



Figure 6: Cotton price vs. change in total revenue

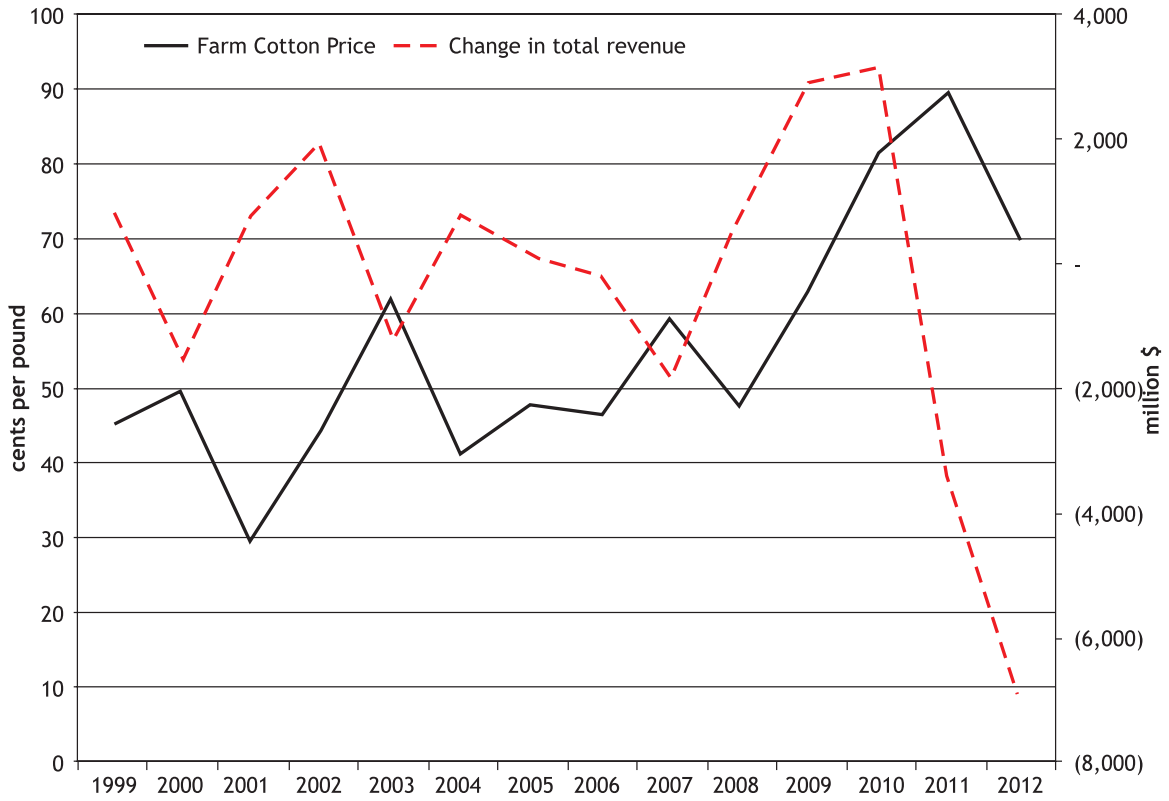
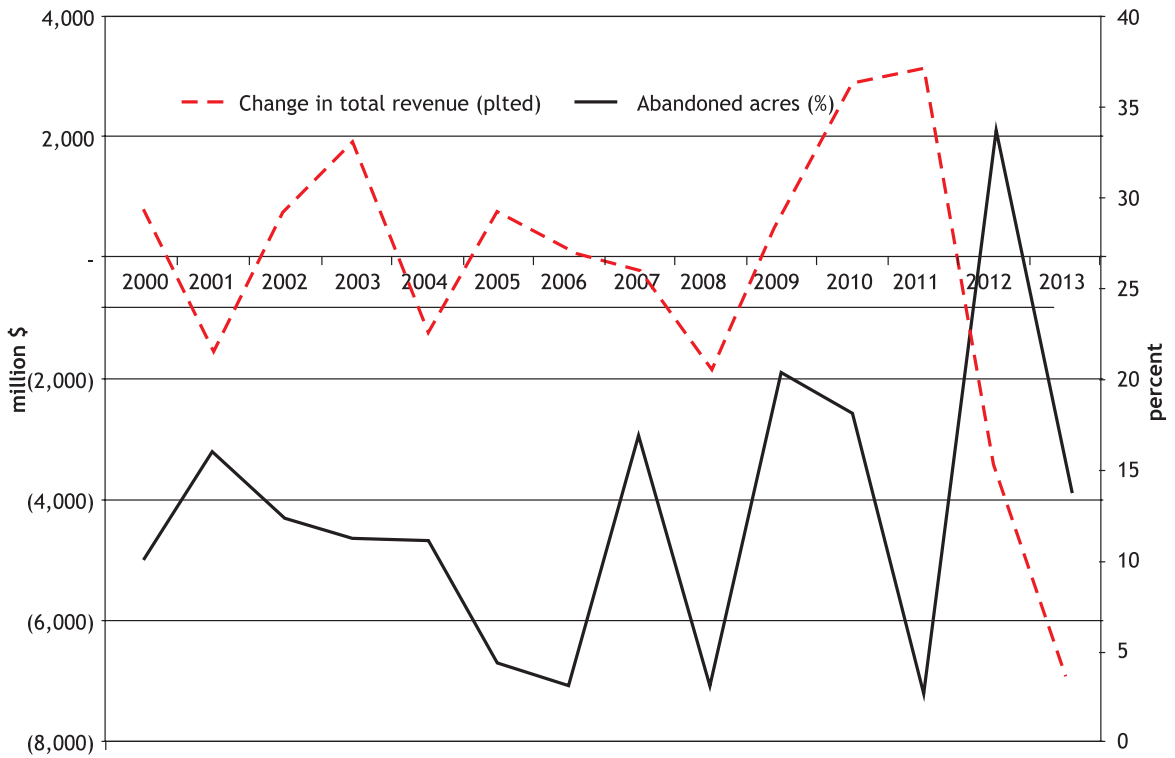


Figure 7: Change in total revenue versus abandoned acres



To illustrate how LDPs differ from the STAX, consider the hypothetical effects of adopting a loan rate equal to minimum price of \$0.686 per pound for the STAX programme in the House version of the 2012 Farm Bill. We therefore set the loan rate (for the LDP program) and the target price (for the CCP program) both at \$0.6861 per pound. We also simulate the LDP

and CCP subsidy costs for a loan rate and target price of \$0.59 per pound, based on plausible future market prices from Figure 8.

The results are presented in Table 2 for three different market price scenarios: \$0.71, \$0.59 and \$0.479 per pound. The assumed acres and yields are documented in the footnote of the table.

Figure 8: Historical Cotton Price in Perspective

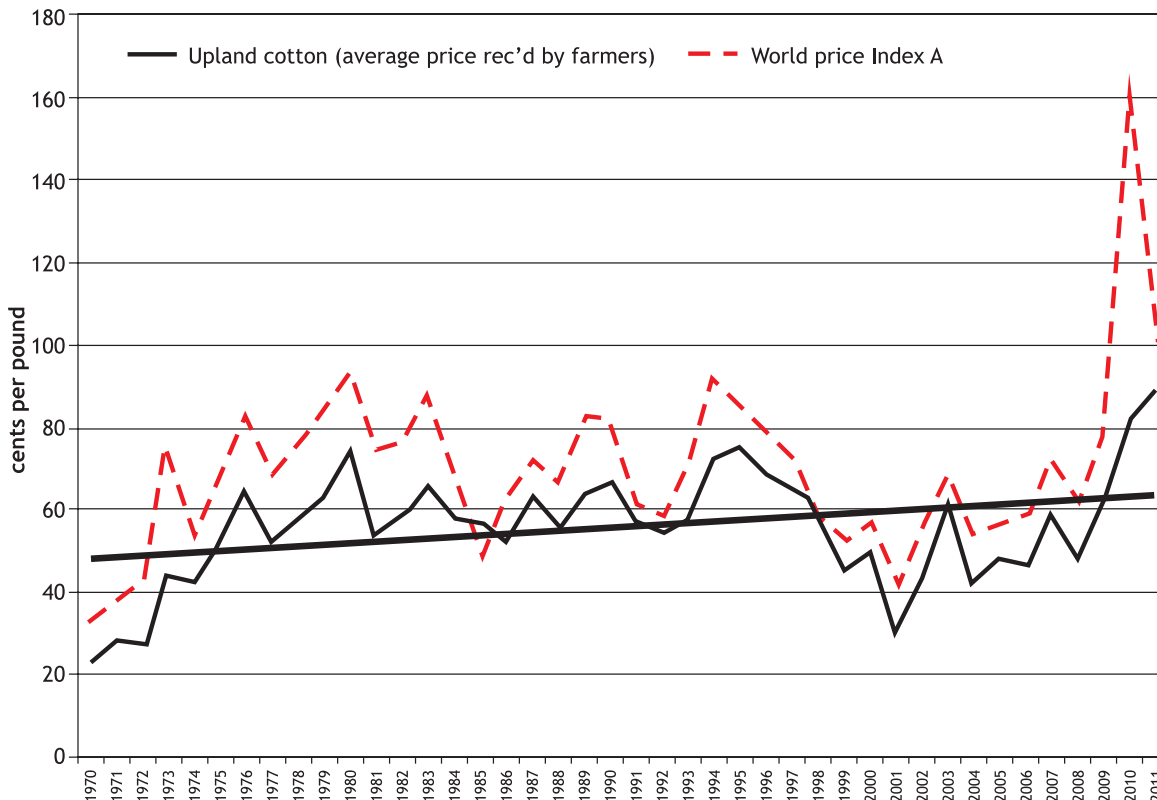


Table 2. Subsidies for Alternative Target/Loan Rates and Market Price Scenarios

	Subsidies (mil. \$)				STAX
	CCPs		LDPs		
	Target/Loan rates		Target/Loan rates		
	0.6861	\$0.59	0.6861	0.59	
<b>Market Prices</b>					
\$0.71	0	0	0	0	379.2
\$0.59	0	942	814,5	0	-
\$0.479	1079	2021	1760	321,5	707,8

Source: calculated.

Acres (million) and yields (pounds per acre) assumed are CBO (2012a) average for 2013-22: planted acres 10.95; harvested acres 9.482; payment acres 15.382; average yield 827; and payment yield 632.

With market prices at \$0.71 per pound (as in Babcock and Paulson, 2012 and CBO, 2012a), LDPs and CCPs will clearly be zero as are LDP subsidies at a market price of \$0.59 per pound but CCPs would be \$942 mil. at this latter market price. At the market price of \$0.479 per pound (the average price used by Babcock and Paulson (2012) for the low price scenario 2003-17), CCPs would total \$2,021 mil. and LDPs \$321.5 mil. in this low market price scenario. Clearly, these are far higher numbers than Babcock and Paulson (2012) calculated for the average STAX subsidies of \$707.8 mil. in the low price regime scenario.

The numbers in Table 2 for CCPs indicate that the elimination of the CCP program will be a desirable outcome. But with a market price of \$0.479 per pound, the House legislation proposed specifically for cotton has the loan rate determined by the previous two-year average of the AWP and varies between a minimum of \$0.47 per pound and a maximum of \$0.52 per pound.<sup>15</sup> The cost of the LDPs is unlikely to be anywhere close to the estimated \$1,760,814.5 or \$321.5 mil. in the scenarios depicted in Table 2.

Apart from STAX, both the House and Senate proposals for cotton include a loan rate for the LDP program that varies with market prices (with a lower bound of \$0.47 per pound and a maximum of \$0.52 per pound). This will lower the costs of the LDPs in the low price scenarios presented in Table 2 significantly, therefore going part way in satisfying the terms of the interim US-Brazil Agreement in Brazil's favor. This is shown in Table 3 where we allow the loan rate to vary between \$0.47 and \$0.52 per pound, based on a two-year moving average of the AWP as proposed in the legislation.

The fourth column in Table 3 gives the "new" loan rate if current proposed legislation was adopted in the past. The cost savings are given in the last two columns (compared to a simulated taxpayer costs for the LDP program - see footnotes 4 and 19 for the complications if one does otherwise). These savings are significant, in the order of about one-half. Of course what happens in the future and if these savings would be realized will depend on the behavior of market prices and production levels, both of which are uncertain as of now.

**Table 3. What if the Loan Rate Varied with Market Prices in the Past**

	AWP	Prev. 2-yr ave AWP	Current loan rate	New loan rate*		Production (1,000 480 LB bales)	Simulated LDP costs mil. \$	Cost savings	
	cents per pound							mil. \$	% of LDPs
Crop year									
1998	44,6	-	-		-	-	-	-	
1999	38,9	-	-		-	-	-	-	
2000	43,6	41,8	52	47	5	16 799	826,5	403,2	49%
2001	28,5	41,3	52	47	5	19 603	1 011,5	470,5	47%
2002	43,3	36,1	52	47	5	16 531	1 265,6	396,7	31%
2003	55	35,9	52	47	5	17 823	1 377,4	427,8	31%
2004	38,9	49,2	52	49,2	2,9	22 505	307,9	307,9	100%
2005	42,1	47,0	52	47	5	23 260	563,8	558,2	99%
2006	44,8	40,5	52	47	5	20 823	1 149,4	499,8	43%
2007	59	43,5	52	47	5	18 355	753,3	440,5	58%
2008	45	51,9	52	51,9	0,1	12 384	5,9	5,9	100%
2009	61,5	52,0	52	52**	0**	11 788	0	0	0%
2010	149	53,3	52	52**	0	18 100	0	0	0%
2011	84	105,3	52	52**	0	15 570	0	0	0%
ave 2000-2008							806,8	390,1	48,3%

\* Loan rate can decline a maximum of 5¢ per LB because minimum loan rate = 47¢ per LB

\*\* No change in the loan rate means the 2-year moving ave AWP is above the max loan rate of 52¢ per LB

Source: Simulated by authors.

Nevertheless, the STAX minimum price will not be anywhere close to acting like a LDP because the STAX subsidy is calculated as a factor of the difference in two revenues: one expected and realized.<sup>16</sup> We can look at historical data to assess what share of the 20 percent revenue cap that CIP subsidies make up. Between 1999-2005 and 2006-2012 subsidies for CIP premiums have made up 29 and 23 percent of the previously mentioned maximum. Moreover, subsidies were generally greater than 20 percent of revenues, but were close to 20 percent in recent years (Figure 4).

Farmers are also not always at maximum coverage. Babcock and Paulson (2012) show that 22 percent of the cotton crop insured is at a coverage level of 50 percent and the proportion declines to 2 percent at the 80 percent coverage level (with 93 percent of the crop participating). However, with the addition of the STAX program, the increase in subsidies will induce higher coverage and participation rates (Babcock and Paulson, 2012; Zulauf and Orden, 2012).

## 8. THE CHANGING COMPETIVENESS OF THE US COTTON SECTOR

There has been a structural shift in crop prices since 2006/07 (Baffes and Haniotis, 2010; Gilbert, 2010; Headey and Fan, 2010). The relative corn to cotton price is given in Figure 9 where relative corn prices are showing a strong upward trend. The current trend value is 0.1061 while the period average is 0.0832 and the current value as of September 2012 is 0.1729. In the new era of high crop prices, cotton prices have lagged in relation to other crops. An important consideration is that one of the

reasons crop prices are high is that high oil prices since 2004 have activated environmental and energy policies that kick-started biofuel prices and hence crop prices (Rausser and de Gorter, 2012). As a result, US cotton production costs have soared. Meanwhile, yield per acre has flattened out in exactly the time period corresponding to high prices for other crops and high input costs for all capital/energy intensive crop production. These remarkable developments for cotton are shown in Figure 10.

Figure 9: Corn over cotton price (\$/tonne)

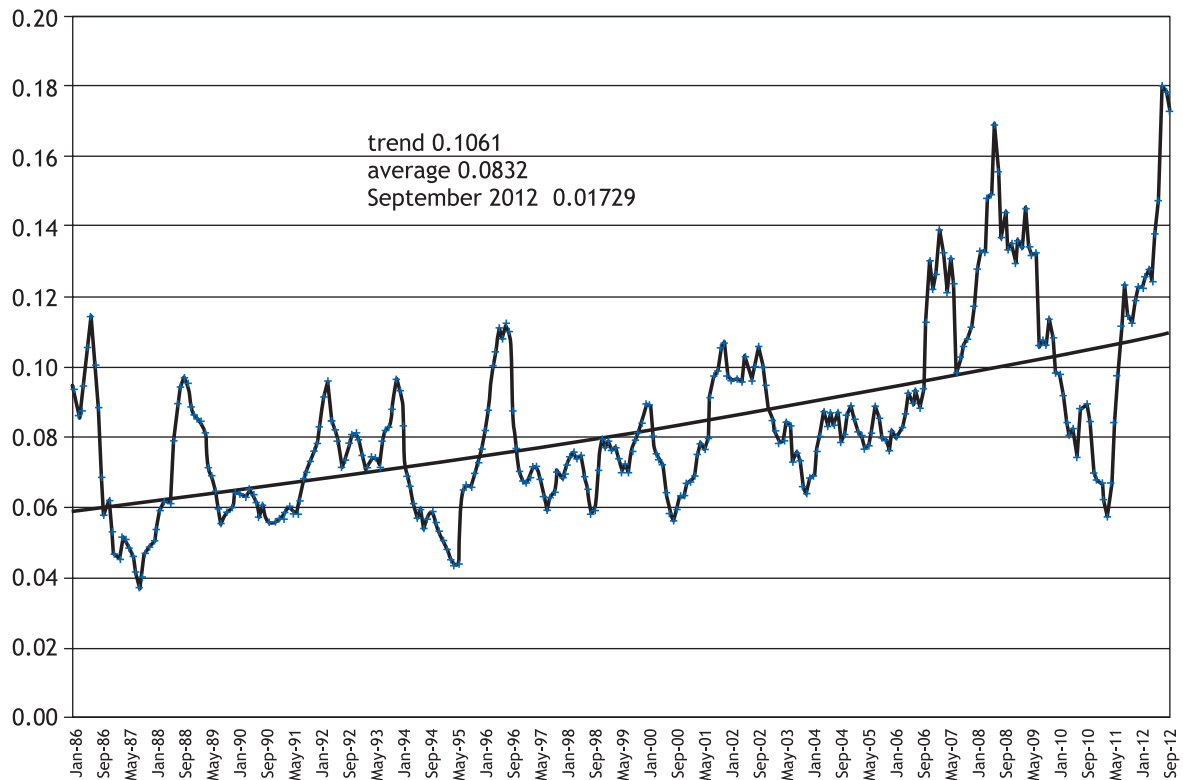
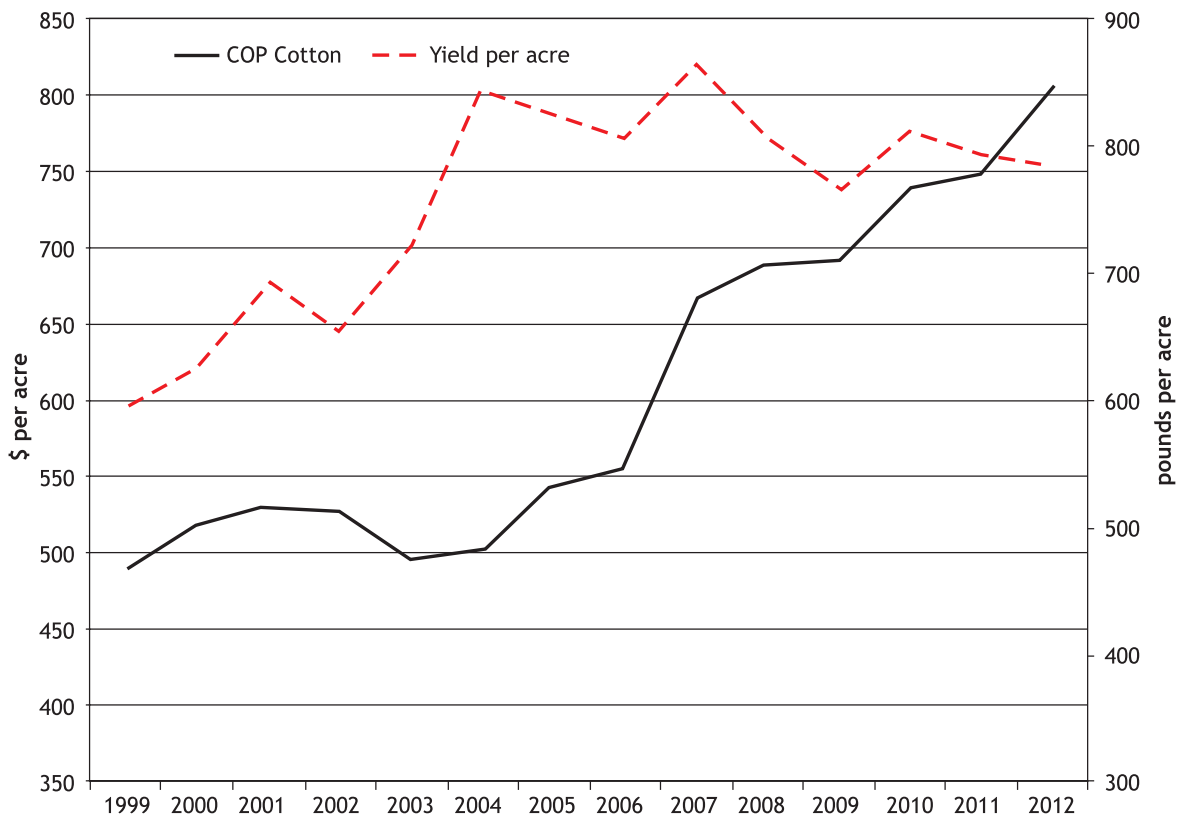


Figure 10: Cotton Productivity not keeping up with Costs of Production



As a consequence, profitability in US cotton production has suffered in recent years. Figure 11 shows the average revenue minus costs for the five major field crops in the United States and cotton along with rice have been the least profitable. Cotton acres have suffered as a result and are down substantially below trend in the past few years (Figure 12). Total

cotton subsidies as a share of the costs of production are down dramatically as shown in Figure 13, from over 40 percent to less than 20 percent. The relative prices of cotton to grains and cotton along with rice have been the least profitable. Cotton acres have suffered as a result and are down substantially below trend in the past few years (Figure 12). There is a decided correlation between this relative price ratio and acres with a significant downward trend in both variables.

Figure 11: Revenue minus costs of production per acre (2012/11 and 2011/12 average)

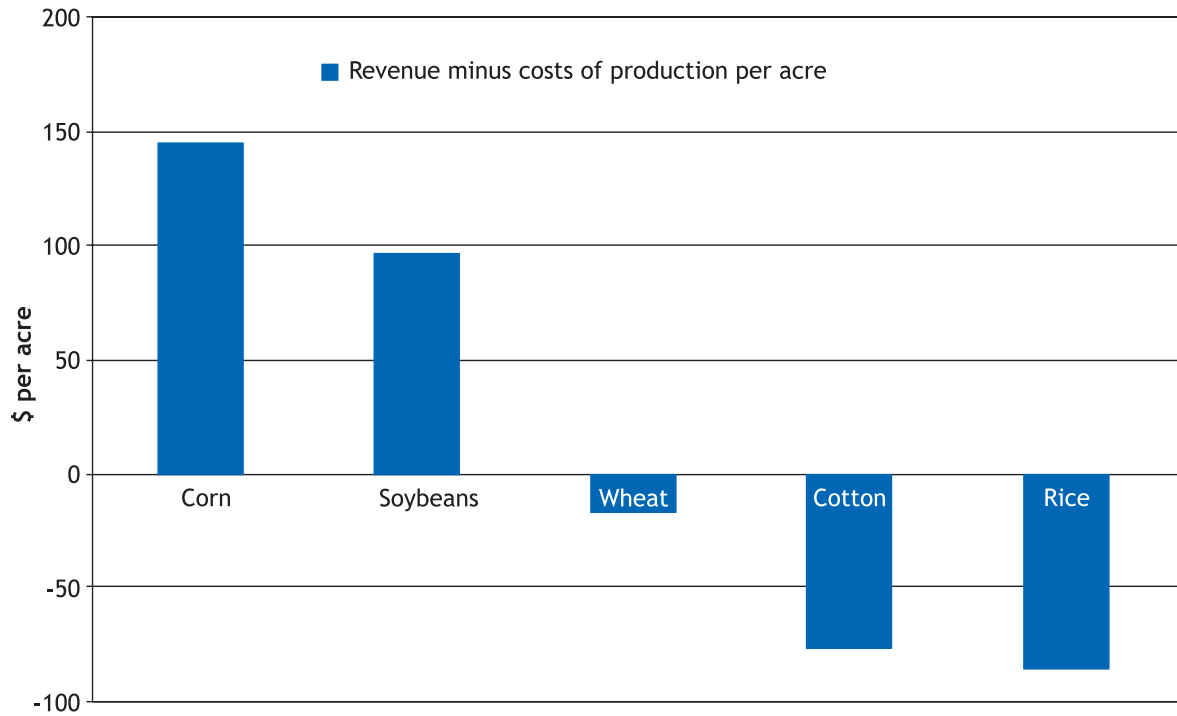


Figure 12: Cotton acres harvested (upland)

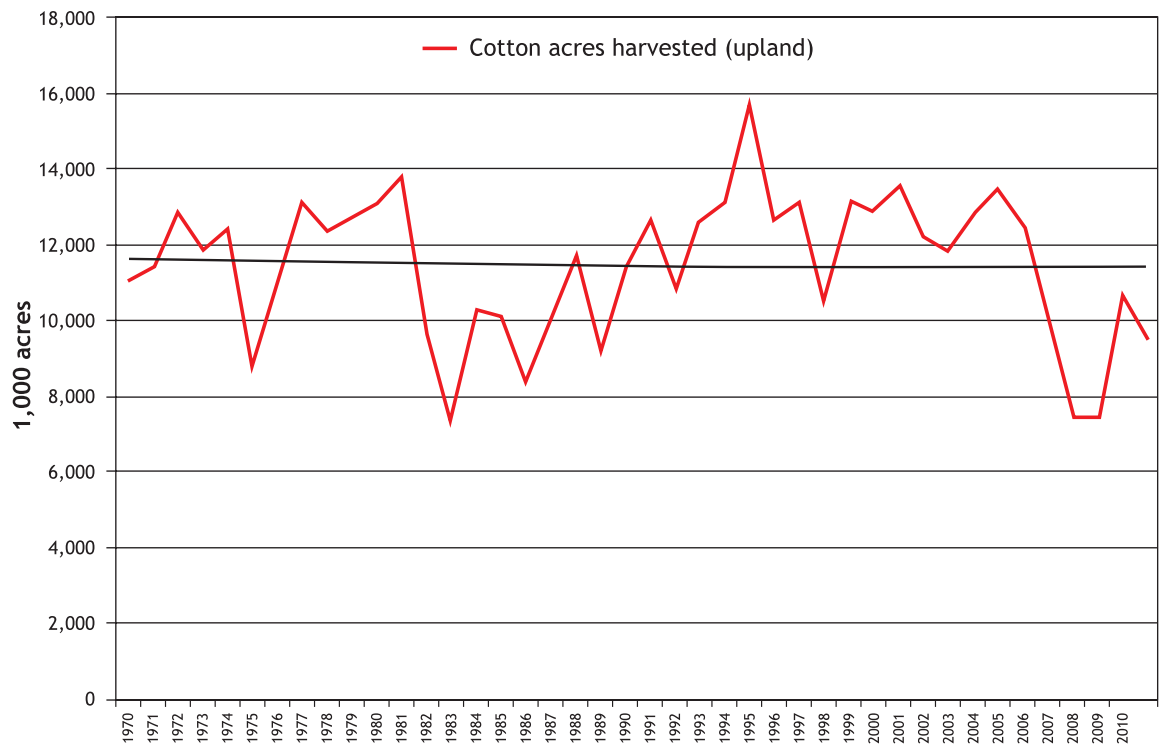


Figure 13: Total Cotton Subsidies as a share of Costs of Production

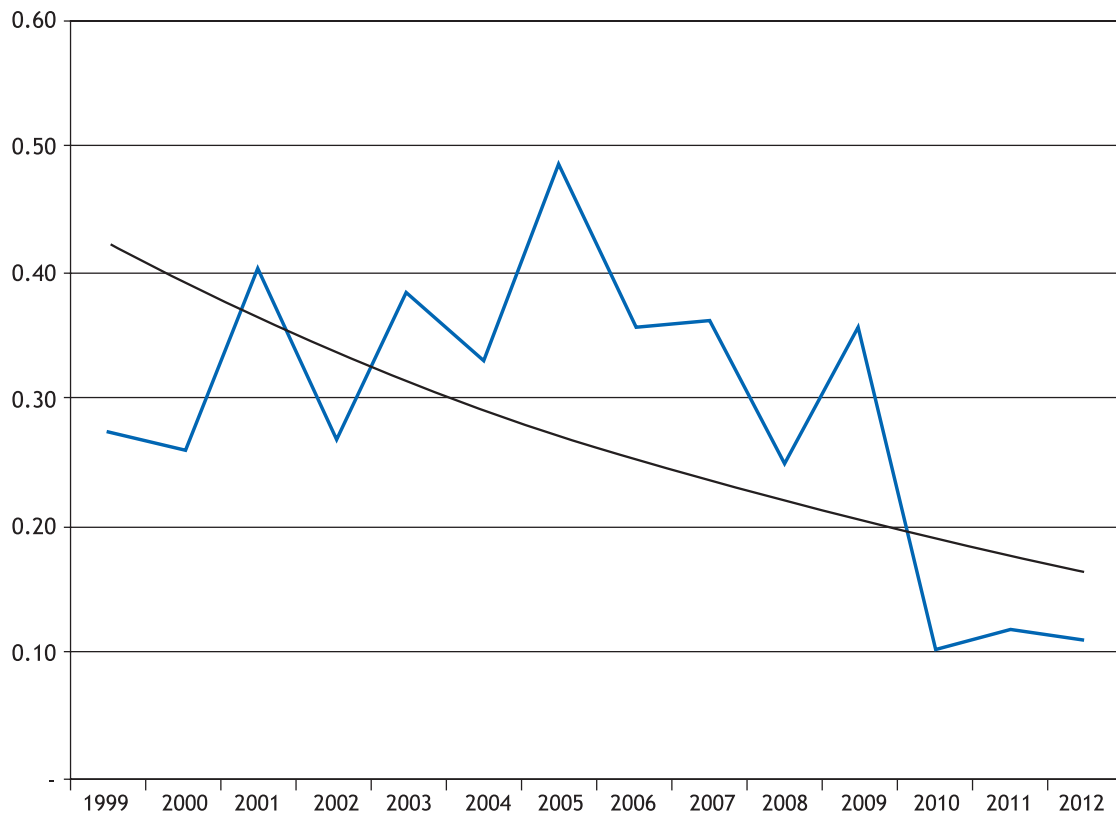
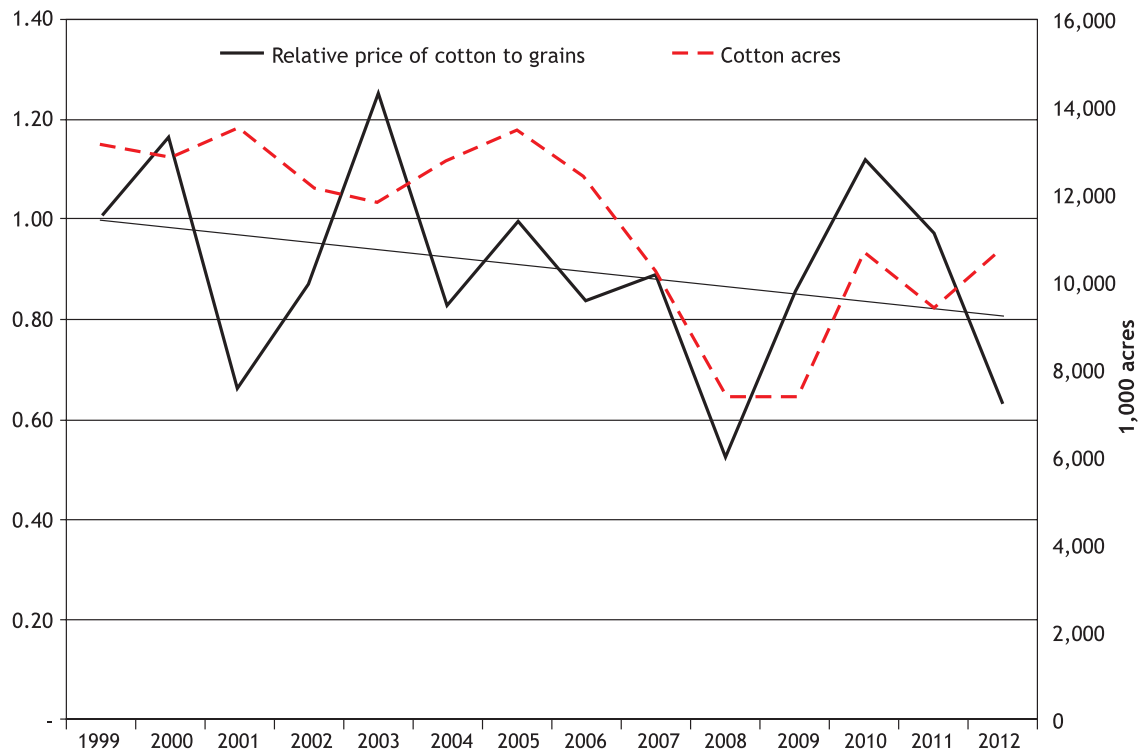


Figure 14: Relative Price of Cotton to Grains vs. Cotton Acres





Cotton has been losing the battle for land in the United States over the past 85 years—falling from its high point of 46 million acres in 1925 to a recent low of 9 million acres in 2009—due to cotton’s high domestic cost structure, growing international competition on the supply side, a declining domestic textile industry and a growing number of synthetic alternatives on the demand side. While the upland cotton area seems to have stabilized in a range of 10 to 14 million acres this past decade, it will likely never expand much beyond 14 million acres due to the market forces described here.

The takeaway is that there has not only been a shift in comparative advantage away from

the production of cotton to other crops within the United States but also between capital and energy intensive cotton producers in the United States and developing countries that are labor intensive and have lower wage rates. So it is important on the one hand to make sure US cotton subsidies do not offset this new comparative advantage for developing countries but it is also important to realize that if cotton prices trend lower in future years, US cotton production will fall, unless oil prices plummet or technology advances in cotton suddenly appear. Furthermore, with endogenous loan rates that fall when market prices fall, LDPs will fall as well because of lower payment rates and lower levels of production.

## 9. POLICY CHARACTERISTICS OF US COTTON RELATIVE TO OTHER CROPS

So far we have recognized that the STAX proposal for cotton in both the House and Senate versions of the proposed 2012 Farm Bills differ remarkably from other crops. The STAX is a revenue insurance program with many features like the other types of revenue insurance programs offered to other crops. But there are also sharp differences. The STAX is integrated with the CIP and does not necessarily double count benefits but rather is supposed to complement the CIP by covering “shallow losses”. Other crops are having the CCP program transformed into various proposed revenue insurance programs with new, in many cases higher, trigger or target prices with updating of base acres and payment yields. None of this applies to cotton.

To summarize the current favorable policy scenario for cotton versus other crops, let us evaluate some important characteristics outlined in Table 4. Cotton represents just 3.6 percent of total crop acres<sup>17</sup> but has 7.8 percent of total base acres. Cotton represents 3.7 percent of total crop revenues but obtained 9.3 percent of total CIP subsidies. Cotton farmers DPs are 11.7 percent and cotton obtains 18.1 percent of total crop subsidies. Cotton comes away with 20 (25) percent of loan deficiency payments (if one includes certificate gains). Finally, cotton obtains over 50 percent of the CCPs historically.

**Table 4. The Relative Market Characteristics of Cotton**

Cotton's share of	
Total Crop Acres Planted 2007-12	3,61%
Total Crop Revenue 2007-12	3,65%
All Crop Base Acres	7,8%
Total Crop Insurance Subsidies 1999-2012	8,3%
Total Direct Payments 2002-2011	11,7%
Total Crop Subsidies 2004-2011	18,1%
Loan Deficiency Payments	
Excluding certificate gains	20%
Including certificate gains	25%
Total Countercyclical Payments 2002-2010	50,6%

Source: calculated

The positive relative standing of cotton over other crops in terms of subsidies is also highlighted in Figure 15 where the ratio of the target over market price is depicted over time.

Again, cotton benefited the most in the past as it also had the highest ratio of planted over payment acres (Figure 16).

Figure 15: Target price over market price

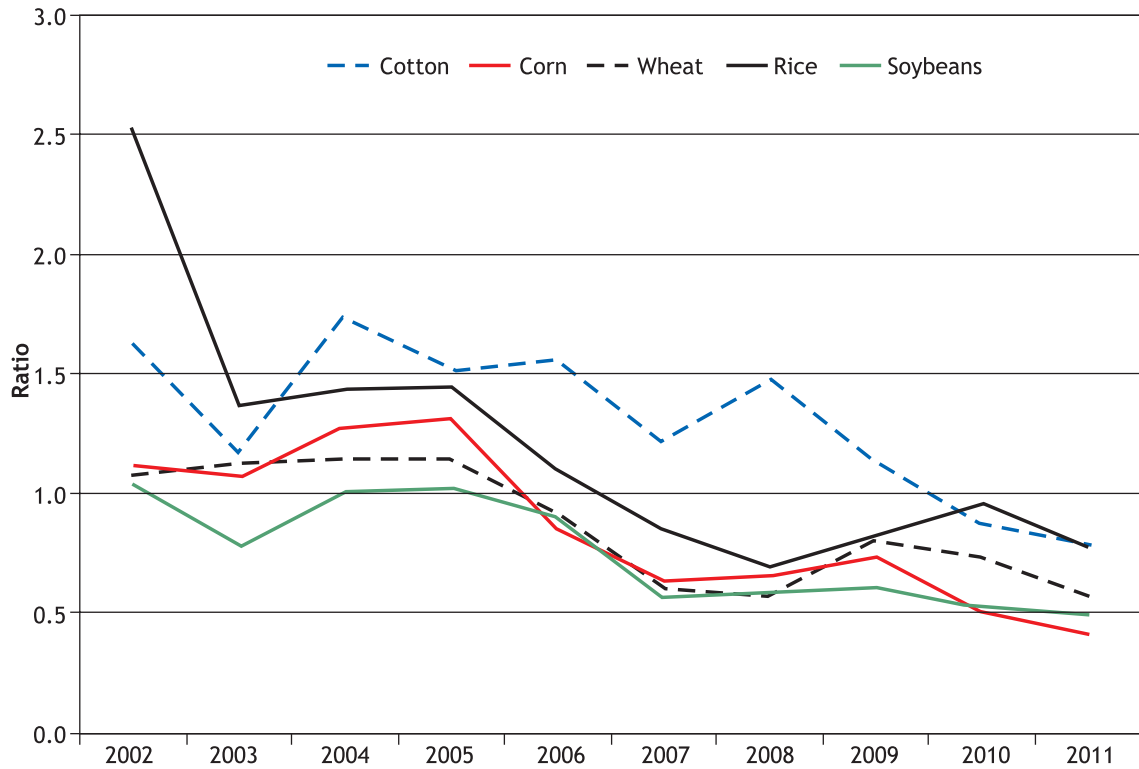
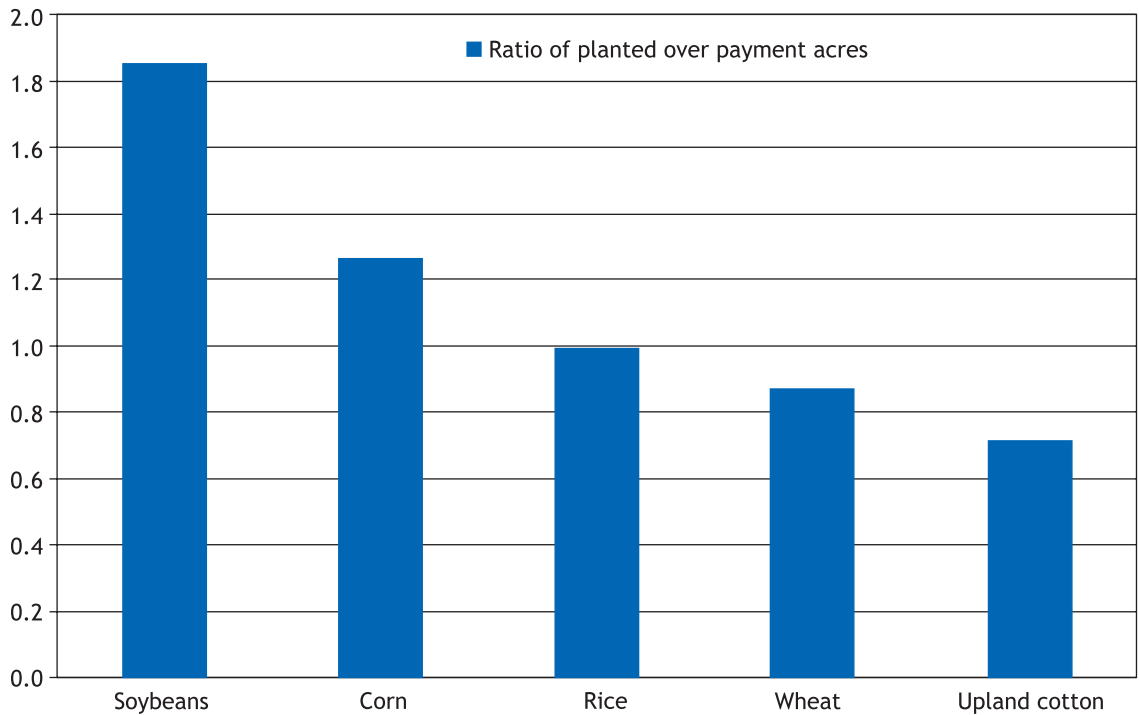


Figure 16: Ratio of planted over payment acres by crop



The CIP subsidies listed in Table 4 requires closer inspection. From the table one can observe that cotton gets only 8.3 percent of total CIP subsidies yet its share of all other subsidies is higher. Nevertheless, in the 2001-2011 crop years, the net insurance payment per acre insured varied from \$4.89 for soybeans to \$30.17 for cotton (Zulauf and Orden 2012). But a high per acre subsidy does not necessarily translate into a share of the total CIP subsidies made, especially compared to the subsidy programs in the past, as the data in Table 4 show.

The new 2012 Farm Bills are proposing the elimination of all of the other subsidy programs except LDPs while enhancing crop insurance for cotton with STAX. Since the loan rate will now vary if market prices decline, the level of cotton LDP subsidies will be reduced relative to other crop sectors.

With current 2012 Farm Bill proposals calling for the end of CCPs, DPs and ACRE for cotton specifically, and with a cotton loan rate that falls with market prices ( a decline of a maximum of 10 percent in a truly low price regime due to limits in the legislation), it represents a good opportunity for US cotton policy reform. As the discussion of Table 4 and Figures 15 and 16 shows, cotton has had the advantages in subsidies historically. Our earlier discussion showed that in terms of market prices, costs of production and yields per acre, cotton has done the worst in recent years. So the current policy proposals represent an opportunity for policy reform, provided they are implemented in a credible manner with no backsliding should market conditions get worse in the future.

## 10. CONCLUDING REMARKS

There are several advantages and disadvantages of the proposed STAX for cotton. The disadvantages include the fact that subsidies are based on planted acres (rather than harvested acres for LDPs and base acres for DPs and CCPs) so total subsidies will be higher, everything else held constant. Furthermore, net revenue per acre is subsidized, unlike the partially decoupled nature of DPs and CCPs. The STAX can complement the federal CIP which many argue is over subsidized to begin with (Babcock 2012a,b, Babcock and Paulsen, 2012, and Zulauf and Orden, 2012). The STAX for cotton is expected to be about \$350 mil. in annual subsidies, assuming the high price era continues. STAX subsidies therefore will about double the average CIP subsidies that cotton producers have received in the last three years. Finally, the minimum price of \$0.6871 in the House committee's proposal is problematic as STAX costs will be maintained if we return to lower price levels. Historically, the CIP has not been contentious between the United States and Brazil, or in any trade dispute for that matter, but that might change in the future as CIP subsidies are higher in a high price era (Zulauf and Orden 2012).<sup>19</sup>

One advantage of adopting the proposed STAX legislation for cotton is the increased flexibility. Subsidies in the STAX will depend on expected versus realized market prices while loan rates decline with market prices, unlike in previous legislation. The STAX is partially decoupled because it is based on state average yields, the per acre payout is constrained to 20 percent of expected revenues, and a farmer deductible of 10 percent is required. If we return to a low price era, the CIP subsidies are expected to decline, as would STAX subsidies *provided* the minimum price of \$0.6871 in the House committee's proposal is eliminated. More analysis has to be done on the exact economics of the STAX interacting with the federal CIP.

The proposed elimination of DPs and CCPs can have very significant reductions in trade

distortions - the trade distorting effects of these programs have been significant in the past. In addition, having the cotton loan rate declining with market prices to a low of \$0.47 per pound (a 10 percent reduction in the loan rate) can reduce LDPs by 50 percent using historical data. This would be a significant reduction in trade distortions should historical price levels return.

The proposed legislation for other crops have several undesirable features that the proposed cotton legislation has avoided, such as, updating payment yields and raising support prices above current target prices (Zulauf and Orden, 2012). Furthermore, cotton has always had the highest share of subsidy programs compared to all other crops. This is unlikely to continue, given the structure of the proposed legislation and the declining competitiveness of US cotton production. Declining competitiveness will help Brazilian and West African/C4 producers as US production will likely stabilize around a lower level, thereby allowing other countries to benefit.

The production distortions of the STAX will also depend on a number of other unknown variables. Will the STAX cause an increase in participation and coverage rates of the CIP and hence increase subsidies of the CIP too? Furthermore, the US cotton industry is under pressure, losing comparative advantage with other crops in the United States and with cotton in developing countries because of higher input costs (energy) and higher opportunity costs relative prices of other crops have increased and so cotton is losing the competition for land. Will the large increase in the costs of production for cotton, declining cotton acres and stagnating cotton productivity (yields per acre) be reversed in the future? Will lower prices with an endogenous loan rate, along with higher inputs costs and opportunity costs in production along with lower productivity means cotton production will decline and the level of production distortion will be much lower than before with LDPs? These and other

unknowns will affect the distorting nature of current proposed legislation for cotton.

Brazil should call for the elimination of any minimum price like that proposed by the House committee of \$0.6861 per pound. Brazil should also focus on improving the structure of STAX so that it is truly supplemental to the CIP, rather than overlapping and adding subsidies beyond the deductible. One big advantage for Brazil to accept an agreement with the United States on cotton with the current proposed legislation (with the provisos in the previous two sentences) is that it provides a commitment mechanism whereby Congress

will be restrained from legislating additional interventions when a downturn in prices occurs in the future. Although, historically, the CIP subsidies are normally self-disciplining, in that they are market price sensitive as prices and production often go in opposite directions, the CIP needs to now be monitored and be detailed in any future agreement between Brazil and the United States. The policy details of the CIP have evolved in recent years as producers have moved to revenue insurance (from yield insurance) and both farm participation rates in the CIP and taxpayer subsidies have increased (Babcock 2012a,b; Babcock and Paulsen, 2012; Zulauf and Orden, 2012).

## ENDNOTES

- 1 Jales (2010) estimates cotton prices declined 6 percent due to US cotton subsidies while Sumner (2003) estimated the price decline to be twice that.
- 2 Both the House and Senate versions have a new revenue insurance program called Supplemental Coverage Option (SCO) for all crop farmers but it is an option for cotton farmers who can participate only if they substitute it for the STAX program. We analyze the STAX only.
- 3 This paper lumps loan deficiency payments, marketing assistance loans and marketing loan gains and certificate gains in one category called LDPs.
- 4 The permanent disaster assistance programs—SURE, LIP, LFP, ELAP, and TAP—expired on Sept. 30, 2011. These five programs were authorized only for losses caused by weather events that occurred on or before September 30, 2011, and not through the entire life of the 2008 farm bill (which generally ends on September 30, 2012). Consequently, losses caused by events after September 30, 2011, are not covered.
- 5 These new revenue insurance programs are to strengthen or complement the federal CIP.
- 6 A minimum price of 47 cents per pound is assumed for these programs.
- 7 A coverage level of 70 percent is the most common across all crops but the highest share of cotton acres insured was at the 75 percent coverage level (Babcock and Paulson 2012).
- 8 We ignore the minimum price proposal in the House version of STAX for now.
- 9 We assume the value of  $\gamma = 1$  in the analysis to follow but the value of  $\gamma$  can be 1.2 if the farm is not participating in the CIP.
- 10 The STAX establishes coverage based on an expected price calculated under an existing program called Group Risk Income Protection (GRIP). This is also the area wide policy offered by the CIP. The expected county yield is the higher of the expected county yield for area wide plans or the average of applicable yield data from the county for the most recent 5 years, excluding the highest and lowest years, and uses a multiplier factor to establish maximum protection per acre of not more than 120 percent. For a description of GRIP, see William Edwards at <http://www.extension.iastate.edu/Publications/FM1850.pdf>.
- 11 Prices and or yields although prices can go up in response to a low yield, thereby offsetting the loss due to a poor yield.
- 12 There is one important feature of the House proposal that calls for a minimum price of \$0.6871 per pound with the STAX. This feature is especially distorting as will be shown in the more detailed analysis to follow
- 13 This requires the use of a stochastic model that estimates program payments by county and farm-level and then is aggregated to the national level. See Babcock and Paulson (2012) and CBO (2012a,b).
- 14 Subject to a maximum payout of 20 percent of the expected revenue.
- 15 The AWP is the “adjusted world price” for cotton and is the market price upon which LDPs are calculated.
- 16 Subject to a maximum of 20 percent of forecast revenue.

- 17 The major field crops include coarse grains, wheat, oilseeds, cotton and rice.
- 18 There is a controversy over certificate gains as the US government does not notify such payments to the tax authorities while some economists argue they have identical subsidy effects as loan deficiency and marketing loan gains (Harl and McEowen, undated).
- 19 It should also be pointed out that the AMS ceiling is in nominal \$ and so is not a moving target or percent of total production revenues per year. Therefore, the new high price regime that we are now in means the AMS is much more of a constraint as input costs go up. High prices would also make the AMS commitments more of a constraint since revenue programs will have higher costs when yield losses are the same.



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- Soybean prices [(US), c.i.f. Rotterdam]
- Corn price [Maize (US), no. 2, yellow, f.o.b. US Gulf ports]
- Rice price [(Thailand), 5% broken, white rice (WR), milled, indicative price based on weekly surveys of export transactions, government standard, f.o.b. Bangkok]
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### (5) Cotton and Wool Outlook, Economic Research Service, USDA

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- Upland cotton acres planted
- Upland cotton acres harvested
- Upland cotton yield per harvested acre
- Upland cotton production

### (6) Economic Research Service, USDA

<http://www.ers.usda.gov/topics/farm-economy/farm-commodity-policy/data.aspx>

<http://www.fsa.usda.gov/FSA/webapp?area=about&subject=landing&topic=bap-bu-cc>

- Loan rates
- Target prices
- Counter-cyclical payments

- Loan deficiency payments
- Direct payments
- Base acres
- Subsidies
- Abandoned acres

(7) Environmental Working Group, data based on USDA sources

<http://farm.ewg.org/region.php?fips=00000&statename=theUnitedStates>

<http://farm.ewg.org/progdetail.php?fips=00000&progcode=cotton>

- Total subsidies by crop

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