

United States – Subsidies on Upland Cotton

(WT/DS267)

**Comments of the United States of America
on Comments by Brazil on
U.S. Comments Concerning Brazil's Econometric Model**

January 28, 2004

I. Introduction

1. The United States wishes to rebut Brazil's response to the U.S. 22 December 2003 Comments Concerning Brazil's Econometric Model. Our aim is to make clear the fundamental flaws in Brazil's analysis that invalidate its claims. In the following section, we lay out the erroneous approach Dr. Sumner took in modeling the effects of cotton payments. We believe that our rebuttal provides convincing evidence why the Panel should reject this model as supporting a finding of serious prejudice. Moreover, Dr. Sumner's rebuttal fails to allay our concerns regarding technical issues and lack of transparency with the model. These concerns are laid out in Section III.

II. U.S. Concerns with the Sumner Model

2. The United States reiterates the following concerns it has with Brazil's approach to its economic analysis in this dispute:

a. Dr. Sumner continues to imply that his model is essentially the FAPRI model. It is not. Dr. Sumner has made significant modifications to the FAPRI model. The fact that Dr. Sumner's model is "in no way a FAPRI model" is acknowledged by Dr. Babcock in his letter to staff members of the Senate and House of Representatives (Exhibit US-114).

b. The ways in which Dr. Sumner has modeled decoupled payments (including Production Flexibility Contract payments, Market Loss Assistance payments, Direct payments and Counter cyclical payments), crop insurance payments, and export credit guarantees differ sharply from the FAPRI model and are not based on empirical studies. These *ad hoc* modifications contribute to the large effects on production and other variables obtained by Dr. Sumner when he simulates the removal of cotton subsidies. We argue that the effects are thus largely tautological with no empirical grounding.

c. In particular, Dr. Sumner's results differ sharply from the economics literature on the effects of decoupled payments on production. As we have argued in numerous submissions, Dr. Sumner's treatment of decoupled payments (particularly from Annex I on pages 16-21) is neither a "standard" feature of other models, nor is it as "consistent" with USDA work in the area as repeated citations of that work might suggest. There has been considerable work done by the USDA and other researchers on such programs, both theoretical and empirical, which acknowledges the programs may have some minimal impact on production. However, the research concludes that the impact appears negligible (less than 1 percent of acreage). As we pointed out in our *Comments Concerning Brazil's Econometric Model of December 22, 2003*, similar results are obtained by FAPRI (less than 0.3 percent impact on cotton acreage). In contrast, Dr. Sumner's model produces results suggesting cotton acreage impacts as high as 15.9% - that is, more than 50 times larger than what the FAPRI model would indicate.

d. Likewise, we disagree with Dr. Sumner's modeling of the crop insurance program. We take issue with how the subsidies were calculated and how they affect production. In particular, we have argued that most cotton production has been insured at coverage levels less than 70 percent and thus it is likely that any production effects are minimal. Moreover, we have

noted that Dr. Sumner has failed to take into account the potential effects of moral hazard on input use and crop yields that potentially offset any impacts on area.

e. We also take issue with how Dr. Sumner modeled export credit guarantees. In our previous comments, we have argued that Dr. Sumner’s formulation is entirely *ad hoc*. He has essentially assumed an effect.

f. As for marketing loans and deficiency payments, we would agree that such programs are potentially production distorting when expected market prices fall below loan rates. However, we have argued that the use of lagged prices, while a modeling convenience for large scale models such as FAPRI and the model used by Dr. Sumner, nonetheless introduce potential biases that can overstate effects when futures market prices differ substantially from lagged prices, as they did in 2001 and 2002.

g. Lastly, as we point out in our *Comments on Answers of Brazil to Questions from the Parties following the Second Panel Meeting*, calibrating Dr. Sumner’s model to the November 2002 FAPRI baseline exaggerates the effects of price-based programs such as marketing loans, counter-cyclical payments and Step 2 payments. The price outlook for cotton has improved considerably since publication of the November 2002 FAPRI baseline used by Dr. Sumner to estimate the effects of subsidies on U.S. cotton production. Improving price forecasts suggest minimal marketing loan outlays over 2003-12.

3. We will briefly summarize our points below.

Dr. Sumner’s treatment of decoupled programs is unconventional and not based on theory or empirical evidence

4. Dr. Sumner’s treatment of decoupled payments (particularly from Annex I on pages 16-21) is neither a “standard” feature of other models, nor is it as “consistent” with USDA work in the area as repeated citations of that work might suggest. There has been considerable work done by the USDA and other researchers on such programs, both theoretical and empirical, which acknowledges the programs may have some impact on production, and that those impacts depend in part on farmers’ expectations (Westcott et al., 2002).¹ However, the research concludes that the impact appears negligible.

5. Dr. Sumner, on the other hand, uses a stylized logic to come up with the estimates for the impact of production flexibility contract (PFC) payments that have neither empirical nor theoretical grounding. He cites, then ignores, recent USDA empirical work showing that

¹ Westcott, P., Young, C.E., and Price, M., USDA, ERS, The 2002 Farm Act, Provisions and Implications for Commodity Markets, Economic Research Service, November 2002. (See Exhibit BRA-42)

decoupled payments have only a small impact (ERS 2003).² He justifies this, in part, by saying that the analysis looked at all programs, while he is looking only at cotton. However, in both their inception and administration, these programs must be considered as a whole. Treating part of the overall programs as though they were a “cotton program” distorts the programs. It is widely accepted that these programs have whole farm impacts rather than crop specific impacts—the payments received do not have crop-specific impacts. Furthermore, the impact is much smaller than Dr. Sumner has estimated; the whole farm impact is, at its upper estimate, perhaps one-quarter to one-fifth the impact he cites for cotton alone. He thus vastly overstates the impact of these payments on cotton production.³

6. Dr. Sumner argues that market loss assistance (MLA) payments have a larger effect on area than do PFC payments despite the fact that MLA payments were paid on the identical payment base as the PFC payments. Moreover, MLA payments were authorized by Congress on a *post hoc* basis as emergency supplemental payments. Supplemental legislation authorizing each of these payments was passed several months after planting for the crop year in question had occurred. Dr. Sumner included these payments in his acreage equations and asserts that producers had expectations that they would receive market loss assistance payments at the time of planting. If producers had expectations of payment, then they also knew that they would be eligible to receive such a payment regardless of what crop they planted. Indeed, they could choose not to plant and still be eligible for the payment. This would argue that market loss assistance payments, like production flexibility contract payments, direct payments, and counter-cyclical payments, are decoupled from planting decisions and should not be included in an acreage response equation.⁴

7. Like other direct payments, counter-cyclical payments are based on historical production rather than actual production. The fact that the payment rate is tied to current prices does not mean that payments are less decoupled from current production. Indeed, as economists have shown, producers can hedge counter-cyclical payment rates using options markets, thus converting a counter-cyclical payment into a fixed direct payment.⁵

² USDA, ERS, Decoupled Payments: Household Income Transfers in Contemporary U.S. Agriculture, M.E. Burfisher and J. Hopkins, Eds. USDA ERS AER Number 822. February 2003. (See Exhibit US-53)

³ As we pointed out in our *Comments Concerning Brazil’s Econometric Model of December 22, 2003*, similar results are obtained by FAPRI (less than 0.3 percent impact on cotton acreage). In contrast, Dr. Sumner’s model produces results suggesting cotton acreage impacts as high as 15.9% - that is, more than 50 times larger than what the FAPRI model would indicate.

⁴ Dr. Sumner has argued that base updating provisions of the 2002 Farm Bill effectively relink direct payments to production, but as we have shown in Dr. Glauber’s presentation at the Second Panel Meeting in December 2004, the economics argue the opposite and the empirical evidence suggests that concerns that producers are planting cotton in expectation of future base updating are unfounded.

⁵ Anderson, C.G. “Consider “Hedging” Strategies to Enhance Income Beyond Farm Program Payments” Texas A&M University, Extension Economics, October 2002 (See Exhibit US-54)

8. Lastly, empirical evidence supports the decoupled nature of these payments. As reported in the U.S. Answer to Panel Question 125(5), a preliminary review of data from the Farm Service Agency shows that 47 percent of upland cotton farms eligible for decoupled income support payments planted no cotton in marketing year 2002. This number is consistent with the Environmental Working Group data presented by Brazil in its further rebuttal submission that showed the percent of farms receiving only contract payments in 2000, 2001, and 2002.⁶ Thus, Brazil and the United States would agree that the data support the notion that decoupled income support is, in fact, decoupled from production decisions since nearly half of historic upland cotton farms no longer plant even a single acre of cotton.

9. As was shown in Exhibit US-95, enrolled upland cotton base acreage exceeded planted acreage by over 5.1 million acres. Thus, planted acres accounted for less than 73 percent of total base acres in 2002,⁷ supporting the decoupled-from-production nature of direct and counter-cyclical payments. The ratio of planted acreage to base acreage varies considerably by region, ranging from about 40 percent of eligible base in the West to almost 93 percent of eligible base in the Southeast. The data also support the notion that rather than being required to base planting decisions on acreage base allocations, producers were able to exercise their planting flexibility, clearly choosing to plant other crops instead of cotton.

Dr. Sumner’s analysis of the U.S. crop insurance program ignores effects of moral hazard on yields

10. As we have documented in our previous submissions, crop insurance subsidies are generally available for most crop producers and hence do not give a specific advantage to one crop over another. Thus, their effects are not commodity specific, and have no or minimal impacts on cotton markets.

11. Moreover, crop insurance purchases by cotton growers have generally been at lower coverage levels than for other row crops. This was particularly the case before 2002 when less than 5 percent of insured cotton acres were insured at coverage levels greater than 70 percent. Over 2002-03, roughly 90 percent of cotton acreage insured was at coverage levels of 70 percent or less. This supports the notion that crop insurance has had minimal effects on production.

12. Lastly, the economic literature on the effects of crop insurance on production is clearly mixed. While many studies like the ones cited by Brazil have suggested crop insurance subsidies may have a slight effect on acreage, the effects on production are less clear. If crop insurance encourages moral hazard problems like those cited by Brazil, crop yields will be adversely affected as producers attempt to increase crop insurance indemnities. If moral hazard and

⁶ Brazil’s Further Rebuttal Submission, para. 23.

⁷ We note that these numbers are similar to the Environmental Working Group data that show that 73.6 percent of total contract payments in marketing year 2002 were on farms that also received marketing loan payments.

adverse selection problems are severe, they could potentially have a negative effect on production.⁸

Impacts attributed to the export credit guarantee program are unsubstantiated

13. Neither Brazil nor Dr. Sumner has offered empirical analysis as to how much or whether the export credit guarantee program actually affects exports. As demonstrated in Bra-313, Dr. Sumner imposed an *ad hoc* reduction in U.S. export estimates of 500,000 bales (using the National Cotton Council testimony as his sole economic foundation), which correspondingly reduced U.S. prices, which correspondingly both reduced U.S. acreage and slightly increased exports - cutting into the initially imposed 500,000 bale shift.

The effects of marketing loans depend on underlying assumptions regarding price expectations

14. As we have argued elsewhere, we agree with the statement of Dr. Collins that marketing loan payments are *potentially* production- and trade-distorting.⁹ The United States has consistently notified upland cotton marketing loan payments as cotton-specific amber box payments in its WTO Domestic Support notifications. The issue in this dispute is not whether marketing loan payments are potentially production- and trade-distorting, but the degree to which they have actually distorted production and trade in a particular year, given market prices and other relevant factors.

15. The degree of distortion caused by the marketing loan program depends on the relationship of the expected harvest price to the loan rate at the time of planting. If the expected price is below the loan rate, the loan rate may provide an incentive to plant cotton because farmers will receive a government payment for the difference between the loan rate and the adjusted world price. For this reason, we believe that the marketing loan program was more distorting in 2002 when expected cash prices were below loan rates at planting than in 2001, when expected cash prices were higher than loan rates at the time of planting. However, as explained previously, the observed decline in upland cotton planted acreage in marketing year 2002 was commensurate with the decline in futures prices over the previous year.

⁸ The Economic Research Service study cited by Dr. Sumner (Young et al. 2001) only examines the effects of crop insurance subsidies on acreage. The authors assume that yields are unaffected when they simulate production effects. Recent studies by Smith and Goodwin (1996), Babcock and Hennessy (1996) and Goodwin and Smith (2003) suggest that farms with more insurance tend to use less inputs like fertilizer and pesticides and vice versa. This demonstrates a potential moral hazard problem with crop insurance that suggests that crop insurance participation may have a negative effect on yields. Lower yields may well offset the marginal effects on crop area.

⁹ See U.S. Answers to Questions of the Panel to the Parties following the Second Meeting of the Panel, December 22, 2004, para. 74.

16. In this dispute two approaches have been advocated in determining farmers’ expectations about prices. Brazil and its economic consultant have used lagged prices as the mechanism to gauge farmers’ expectations about prices. Dr. Sumner wrote:

Of course, it is impossible to know precisely what individual growers expect. I have adopted the long-standing approach of FAPRI, and other models[,] to approximate these expectations by using the current year final realized market prices as the expectation for the following season’s price.¹⁰

The lagged prices used by Brazil and its economic consultant can, at best, be an approximation of farmers’ price expectations. That is because the lagged prices used in Brazil’s analysis incorporate pricing information that occurs *after U.S. farmers make their planting decision* (that is, prices from April through July of a given marketing year, when planting decisions are taken in the January to March period). Therefore, by necessity, farmers cannot be looking at a lagged price that incorporates prices that do not yet exist.

17. The United States, on the other hand, has advocated the use of futures prices, a market-determined expectation of prices. It is evident from the use of futures and options markets by cotton producers¹¹ and from numerous market reports available to producers that producers look to futures markets rather than lagged prices for information regarding future cash prices.

18. Furthermore, economic literature supports this view. For example, in his classic paper on rational price expectations, Muth (Exhibit US-48) argued that there is little evidence that expectations based on past prices are economically meaningful. Additionally, in a 1976 paper Gardner (Exhibit US-49) contended that the future price for next year’s crop is the best proxy for expected price.

19. As we have repeatedly argued, the use of lagged prices may result in biased results. Over the long term, where there is reasonable stability in markets, lagged prices function adequately as a proxy for price expectations. However, in those years, as in the period under investigation here, when unexpected exogenous shocks such as China dumping stocks and unexpected yields worldwide due to good weather conditions, lagged prices are poor predictors of expected prices. Future prices, by contrast, are more efficient because they are based on more current information.

20. For example, during marketing years 2000, 2001, 2002, and 2003, lagged prices significantly understate the harvest season prices expected by producers as seen in the futures prices at the time of planting. The use of lagged prices thereby inflate the effect of the marketing loan rate. In fact, those lagged prices would have to be increased by 8-25 percent, depending on the year, to equal the harvest season price actually expected by producers as indicated by the

¹⁰ Brazil’s Further Submission, Annex I, para. 18.

¹¹ See U.S. Answers to Questions of the Panel to the Parties following the Second Meeting of the Panel, December 22, 2004, para. 58.

futures price.¹² For the period MY 1999-2003, only MY 2002 exhibits expected prices below the marketing loan rate when using futures prices. However, over that same period, when lagged prices are used as expected prices, the loan rate is higher than the expected price *in every year over this period* except MY1999. Thus, it is a significant error for Brazil and Dr. Sumner to use lagged prices instead of the futures prices Brazil’s own expert, Mr. MacDonald, explained to be the more accurate gauge of farmers’ price expectations.

Harvest Futures Prices at Planting Time Compared to “Lagged Prices”(cents per pound)					
	MY1999	MY2000	MY2001	MY2002	MY2003
Futures Price 1/	60.27	61.31	58.63	42.18	59.6
Expected Cash Price 2/	55.27	56.31	53.63	37.18	54.6
Lagged Prices 3/	60.2	45	49.8	29.8	44.5
Difference	-4.93	11.31	3.83	7.38	10.1

1/ February New York futures price for December delivery.

2/ Futures price minus 5 cent cash basis.

3/ Prior crop year average farm price, weighted by monthly marketings.¹³

21. Looking more specifically at Dr. Sumner’s analysis in Annex I provides further evidence of the bias of lagged prices relative to future prices. Consider the 2002 crop year. In the Sumner analysis, area response to the removal of the cotton loan program results in a 36 percent reduction in U.S. planted area – the largest single effect for any of the years considered in his analysis. Based on lagged prices, price expectations for 2002 were 29.8 cents per pound, a 40 percent reduction from 2001 levels. Yet, the futures market data suggests a far smaller reduction in expected price. December futures prices taken as the average daily closing values in February 2002 averaged 42.18 cents per pound, a 28 percent drop from year earlier levels. Based on Dr. Sumner’s range of supply response elasticities of 0.36 to 0.47, a decline of this magnitude would suggest a drop in acreage of 10 to 13 percent from the preceding year. In fact, actual U.S. cotton acreage dropped 12 percent (from 15.5 million acres in 2001 to 13.7 million acres in 2002), suggesting acreage levels entirely consistent with world market conditions and price expectations. Thus, in marketing year 2002, lagged prices would significantly overestimate the decline in plantings in the absence of a marketing loan rate.

22. While the United States would agree with Brazil that it is impossible to know precisely what individual farmers’ price expectations are, the United States argues that futures prices provide the most current expectations of market participants. The United States disagrees with the approach used by Brazil in its analysis to rely solely on lagged prices and ignore information

¹² U.S. Further Rebuttal Submission, paras. 164-65.

¹³ Exhibit US-90.

provided by futures prices. While it may be impractical to include futures prices in some models, modeling convenience is no justification for ignoring these objective, market-based price expectations, and the biased results from using lagged prices do not assist the Panel in making an objective assessment of what is the effect of the U.S. marketing loan program.

Use of the November 2002 baseline exaggerates the effects of the removal of subsidies

23. The price outlook for cotton has improved considerably since publication of the November 2002 FAPRI baseline used by Dr. Sumner to estimate the effects of subsidies on U.S. cotton production. As we show in the *U.S. Response to Brazil’s Answers to the Questions of the Panel of the Parties Following the Second Meeting of the Panel*, FAPRI projections for the Adjusted World Price are as much as 20 cents per pound higher in the November 2003 baseline as under the November 2002 baseline.

24. As a result, estimated marketing loan gains are reduced considerably. Under the November 2003 baseline, the estimated marketing loan gain for 2003/04 is zero, compared to almost 15 cents per pound under the November 2002 baseline. Over the five year period 2003/04 to 2007/08, the average marketing loan gain is estimated to be 1.32 cents per pound. This is compared to 10.39 cents per pound utilizing the November 2002 baseline used by Dr. Sumner in his estimates.

25. Under Dr. Sumner’s model, the marketing loan program contributes to over 42 percent of the estimated effects of removing subsidies on production (*see* Annex 1, table 1.4). Thus, updating the model to the November 2003 baseline would significantly reduce the estimated effect on production, with the remaining effects largely attributed to direct payments under Dr. Sumner’s flawed model, with which we strongly disagree.

26. In addition, the FAPRI baseline from November 2002 projected 50.7 cents per pound for the A-Index for marketing year 2003 and the January 2003 baseline projected 58.4 cents per pound for the A-index for marketing year 2003. FAPRI’s November 2003 preliminary baseline projection for the A-Index is 70.9 cents per pound, 40 percent higher than the FAPRI projections used by Dr. Sumner.¹⁴ The actual A-index was 76.1 cents per pound on January 15, 2004. In fact, FAPRI’s November 2002 projections (through 2012/13) did not show the A-Index ever rising as high as current prices. The current high cotton prices and market expectations of continued high prices are crucially relevant because, as mentioned, marketing loan payments will not be made if cotton prices are above the loan rate of 52 cents per pound and, further, counter-cyclical payments will not be made if the season average farm price is above 65.73 cents per pound (the target price of 72.5 cents minus the direct payment rate of 6.67 cents). The weighted

¹⁴ *Cotton: World Markets and Trade*, Foreign Agricultural Service, USDA. January 2004, Table 8, pg. 20.

average farm price for August-November was 62.4 cents per pound, as reported by USDA on January 11, 2004.¹⁵

Conclusions

27. Brazil’s estimates of the impact of U.S. subsidies on world cotton markets have rested largely on the basis of Dr. Sumner’s flawed model. As we pointed out in our *Comments on Brazil’s Econometric Model*, Dr. Sumner’s model is not the FAPRI model. The modifications he has made are *ad hoc*; rather than being based on empirical research as is claimed, they are, in fact, at odds with the empirical literature.

III. Technical Comments on Brazil’s Rebuttal

28. Brazil's explanations of exactly what was done to the FAPRI/CARD model have been stated and restated by Brazil at least three times to this point.

29. With each new statement, different clarifications are made, different variables used. In Annex I, Brazil submitted its economic analysis of the impacts of the U.S. cotton program. In Bra-313, Brazil provided more detail about its original economic analysis, in light of its seeming inability to provide the Panel with the actual model used. Finally, in its submission of 20 January 2004, Brazil informs the Panel that its Annex I discussion was a "simple heuristic discussion"¹⁶ with Bra-313 explaining how the "heuristic explanation in Annex I was operationalized" and rationalizes the fact it did not use the baseline it stated it did in Annex I as "necessary recalibration."¹⁷ These *post hoc* rationalizations of Annex I differ dramatically from oral statements delivered to the Panel on 7 October 2003.¹⁸

Brazil further confuses the impact of its elasticity modifications

30. Brazil clings to its repeated representations that its model uses "*exactly the same elasticities of supply and demand that are also used in the FAPRI model*,"¹⁹ yet, in its latest iteration of what is really included in its analysis, Brazil seems to be saying something different:

¹⁵ *World Agricultural Supply and Demand Estimates*, USDA, WAOB, WASDE-406, January 11, 2004.

¹⁶ See para. 58, Brazil's Comments on U.S. Model Critique, 20 January 2004.

¹⁷ See para. 3, Brazil's Comments on U.S. Model Critique, 20 January 2004.

¹⁸ "For more detail on these equations and the discussion of the incentives provided, please refer to my written description of the model in Annex I. My Annex I statement discusses in detail the analysis of the production enhancing impacts of the U.S. supply side subsidies." Oral Statement of Dr. Sumner, 7 October 2003, paragraph 11. The United States read these and other statements, and the failure of Brazil to deliver its Annex I analysis, as indication that Brazil meant what it said in Annex I. The U.S. was unaware that the document in which Dr. Sumner "discusses in detail the analysis" was, in fact, a "simple heuristic discussion." That revelation is no doubt a surprise to the Panel, as well.

¹⁹ Oral Statement of Dr. Sumner, 7 October 2003, paragraph 20. A similar comment was made at least twice in Annex I.

As I will demonstrate, the differences between the two sets of estimates of the United States is primarily due to differences in the magnitude of elasticities of supply the United States used, as compared to the elasticities that I actually used. The United States applied time-varying, linear elasticities because this is what is suggested by the FAPRI linear modeling framework. My Annex I results of the effects of these listed programs are, however, based on a constant elasticity structure."²⁰ [emphasis supplied]

31. This current claim contradicts documentation in Annex I, oral statements made before the Panel, and Bra Exhibit-313. Table I.1 of Annex I clearly presents time-varying elasticities. This time-varying approach is again reported in equation (4) – (6) of Exhibit-313. Dr. Sumner's equations clearly indicate that the supply elasticity changes depending on the year t .

32. The United States remains convinced that neither it nor the Panel can be fully sure of whether the elasticities used by Brazil were "exactly the same" as those used in the FAPRI model as Brazil stated on 7 October, or whether those elasticities were based on a different structure entirely, as Brazil states in its 20 January 2004 submission. Brazil has never submitted a simple table showing a comparison of the elasticities.

33. Finally, the United States does not agree with Dr. Sumner that the time-varying, linear elasticities, which would be consistent with the FAPRI modeling framework, lead to a dramatic underestimation of the effects. The United States stands firm by its belief that FAPRI has it right and that Dr. Sumner’s approach leads to a dramatic overestimation of the impacts.

Calibration vs. manipulation vs. mis-labeling²¹

34. The United States pointed out that Brazil stated that its analysis in Annex I was based on the FAPRI November 1 baseline, when it, in fact, was not. Now, Brazil confirms that those baseline numbers were, in fact, "necessarily recalibrated" by Dr. Sumner in order to conform to his use of the CARD International model -- a use that is not consistent with FAPRI's modeling and a use that decidedly was not made clear to the Panel in Annex I,²² contrary to Brazil's assertions in paragraph 24 of its recent submission. Ultimately, Brazil passes off this significant

²⁰ See para. 71, Brazil's Comments on U.S. Model Critique, 20 January 2004.

²¹ See para. 24 and subsequent paragraphs in Brazil’s 20 January submission.

²² In paragraph 3 of Annex I, Dr. Sumner states that he used "the international model and parameters used in two recent publications from [CARD]..." He goes on to state that the "approach used here is standard and has been applied by the USDA Economic Research Service in their analysis of the FSRI Act of 2002....," citing the Westcott study. However, one of the two studies referenced in footnote 4 did not use the CARD International Cotton Model; it used FAPRI's full international model. Similarly, the study referenced in footnote 5 also used FAPRI's full international model. It is clear by reviewing paragraphs 3-11 of Annex I (particularly footnote 10) and Dr. Sumner's Oral Statement of 7 October 2003, that Brazil's documents manifestly led the Panel to believe it was using a broad, multi-commodity international model in its analysis. Only later did Brazil clearly admit it did not use such a model and that all competing crops were not included in its international analysis.

discrepancy as "confusion" in the "labeling of the baseline used in Annex I."²³ This continues a pattern of carelessness in modeling and analysis that has added significantly to the burden in discerning underlying data and model constructs in order to appropriately evaluate the validity of Brazil's proffered results.²⁴

Crop Insurance program results

35. The United States continues to disagree with Dr. Sumner's characterization of the crop insurance program presented in paragraphs 31-33. The United States does not accept Dr. Sumner's logic that \$1 from the crop insurance program that is paid in the event of a crop failure would have the same production impact as \$1 of benefit that is tied directly to the production decision. While the United States does not accept Dr. Sumner's logic, we are puzzled by his operational implementation of the acreage impacts. Dr. Sumner argues that FAPRI's net returns specification includes the value of the crop insurance program by reducing variable costs of production. Based on this first step of reasoning, it is unclear to the United States why Dr. Sumner did not implement his scenario by simply increasing the costs of production in the FAPRI baseline by the amount of the per-acre benefit that he calculates. Such an approach would have produced smaller acreage impacts.

Replicating history and predicting the future

36. In paragraphs 43-56, Dr. Sumner develops a lengthy discussion regarding his view of the use of simulation models. Dr. Sumner dismisses a U.S. concern that Dr. Sumner's analysis does a very poor job of explaining the movement in cotton acreage in the United States. Dr. Sumner appears to assert that policy simulation models do not attempt to "forecast the future." From a layman's point of view, it seems surprising that a model that changes the past and then estimates how that change would have resulted in a different future can be said to not be an attempt to forecast the future.

37. From an economic point of view, the analysis doesn't really change. Economists who develop structural models employ a number of techniques for validating the accuracy and reliability of a model. One of those techniques is testing the ability of the model to simulate actual historical outcomes. In such an historical simulation, the model is solved for each year of a historical period and predicted values for the exogenous variables are compared to the actual data. Not only is the model evaluated based on its ability to approximate historical values, but

²³ See para. 42, Brazil's Comments on U.S. Model Critique, 20 January 2004.

²⁴ The United States notes also that with each discovered discrepancy, Brazil has supposedly rerun its analysis to demonstrate that none of its misstatements has had any appreciable affect on the Sumner model results and asserts this demonstrates the "robustness" of the Sumner model. As noted in the introductory statements to this submission, every economic result ascribed to a FAPRI-type analysis by Brazil contains the same flawed assumptions originally introduced by Dr. Sumner, apart from the few corrections Brazil has made. It is no surprise that each rerun of the same basic construct would reveal the same basic results.

also on its ability to capture the turning points in the observed values, i.e. determine if the model’s predicted values for a variable move in the same direction as the actual values from one year to the next.

38. The process of model validation involves testing the performance of the model over the historical period that corresponds to the timeframe used for the statistical estimation of parameter values, i.e. the in-sample period. In addition, the model will also be tested over a historical period outside of the estimation period. This is referred to as out-of-sample validation. If a model does not perform well under these validation methods, then particular components or equations within the system are evaluated and re-specified.

39. It does not appear that Dr. Sumner employed any of these standard techniques for validating the robustness of his model. It is doubtful that his model, with its modified acreage equations, would pass this common test. However, despite the lack of documented validation of the model, Dr. Sumner nevertheless proceeds to use the model and treats the results as credible.

40. Dr. Sumner’s “simple illustration” provided in paragraph 50 does not address the true issue and is not relevant to the example of U.S. cotton. The United States has repeatedly shown that the overriding economic signals that have affected cotton acreage have been the expected prices of cotton and relevant competing crops.

41. To conclude our response to Dr. Sumner’s arguments in paragraphs 43-56, it is abundantly clear that Dr. Sumner can produce no meaningful empirical validation for his approach. His results are based on forced outcomes that are the results of his *ad hoc* modeling specifications.

Inconsistent descriptions of "full net revenue"

42. In paragraph 63, Dr. Sumner states that “full net revenue including all program payments” form the basis for his model specification. He states that he does not understand how the United States made such a mistaken assumption. Dr. Sumner’s current claim is in direct contradiction to his documentation in Exhibit Bra-313.

43. On page 2, in equation (2) and the subsequent paragraph of Exhibit Bra-313, Dr. Sumner clearly states that his net revenue includes only the farm price and the marketing loan and not the full program payments. Then, in equations (4) - (6), the net revenue, which presumably is the same as specified in equation (2), is again denoted as being a portion of the denominator in his determination of the impacts of the program in question. The United States maintains its assertion that the full program payments should have been in the denominator of the function. Neither the United States nor the Panel can be certain of Dr. Sumner’s exact approach because his explanation changes with each submission.

Incorrect assertions

44. Dr. Sumner's criticisms in paragraph 65 of the calculations provided by the United States are unfounded.

45. The claim in paragraph 65 that the Southern Plains revenue of \$109.04 does not include marketing loan benefits is patently incorrect. The Panel and Dr. Sumner need only to look in cell AO236 of the Equations sheet of the file FINAL US2003CropsModel WORKOUT.xls and they will find that the value of net revenue from the market and the marketing loan is \$109.04. All subsequent critiques on this issue put forth by Dr. Sumner are obviously incorrect because of his error reading the spreadsheets submitted by Brazil.

46. Dr. Sumner attempts to invalidate the U.S. criticisms in paragraph 69-70 by claiming that the numbers are not the ones reported in Annex I. He indicates that the numbers were generated by the United States, but that is incorrect. The United States properly references the source of the acreage impacts as being the file FINAL US2003CropsModel WORKOUT.xls. More specifically, the data come from rows 721-771 of the Equations sheet and are the first-round impacts reported in the model. These are appropriately compared to first-round impacts calculated in the U.S. critique.

Marketing loan and step 2 impacts

47. Given Brazil's efforts to misstate the U.S. position on marketing loan and step 2 impacts in paragraphs 8 and 9, the United States refers the Panel to its earlier discussion included in section G (paragraphs 152, et seq.) in the U.S. Further Rebuttal Submission, 18 November 2003 where the United States stresses the need for the Panel to investigate the actual decisions facing producers making their planting decisions. The United States has also not altered its position regarding the step 2 program. The U.S. submission of 22 December 2003 was directed at its critique of Dr. Sumner's economic modeling. While the U.S. has indicated to the Panel its belief that the FAPRI model is not the best measure of impacts of the marketing loan or step 2 programs, it did not specifically criticize Brazil's analytical method in this regard as Brazil apparently did not make significant changes to the FAPRI model on these points - as it did in virtually every other aspect of its analysis.

Annex I results have never been independently confirmed

48. The models used and outputs obtained by Brazil and submitted to the Panel were not retained by Brazil's employed experts.²⁵ The record remains incomplete with respect to Dr. Sumner's adaptations.

²⁵ See Letter dated October 31, 2003 from Dr. Bruce Babcock to Dr. Dan Sumner, submitted to the Panel by Brazil on November 5, 2003.

49. The United States has found that the current submission by Dr. Sumner is fraught with many of the same types of errors contained in his previous submissions. He disputes numbers that are taken directly from files that either he or Dr. Babcock has provided to the Panel. He continues to provide contradictory explanations and documentation of his methodology. Furthermore, detailed electronic verification of his calculations used in Annex I have never been provided to the United States or the Panel. Dr. Sumner has repeatedly claimed that he has provided all information to the Panel. That is obviously not the case, since new information, such as the regional crop insurance numbers, were just provided in this most recent submission.

Impacts attributed to the export credit guarantee program are unsubstantiated

50. The United States is surprised that, despite repeated opportunities to offer some degree of economic support to the 500,000 bale impact Brazil attributes to the U.S. export credit guarantee program, Brazil has still not done so.²⁶ Worse, Brazil still refers to its estimates of the impact of this program as "conservative." As the United States indicated in its critique of the Sumner model, the figures bandied about regarding acreage impacts of the export credit guarantee program on cotton are anything but conservative.

51. In the September 9 Brazil Submission before the Second Session of the First Panel Meeting, (paragraphs 192-194), Brazil implied that Dr. Sumner's export estimates with respect to the export credit guarantee program were more conservative than the unsubstantiated estimate it cites from the National Cotton Council (the "NCC"). Paragraph 194 of that submission acts as if the NCC estimate of a possible 3 cent per pound U.S. price impact and Dr. Sumner's estimate of a .57 cent per pound world price impact are somehow independent analyses - and demonstrate Dr. Sumner's conservative approach. However, as demonstrated in Bra-313, all Dr. Sumner did was force a reduction in the U.S. export estimates of 500,000 bales (using the NCC testimony as his sole economic foundation), which correspondingly reduced prices in the U.S., which correspondingly both reduced U.S. acreage and slightly increased exports - cutting into the initially imposed 500,000 bale shift.

52. The "different" price estimates were, in fact, estimates of two different sets of prices - U.S. and world. Brazil inappropriately characterized Dr. Sumner's results as being conservative relative to the NCC estimate. (*see* para. 192, Brazil's Further Submission to the Panel, September 9, 2003) Later when the Panel raised a question about the results, Dr. Sumner somehow forced a full 500,000 bale decline in U.S. exports, ignoring the impacts of price response. (*See, e.g.*, Bra-325, last category of tables - export credit guarantee with fixed 500,000 bale impact.) In that response, Brazil also maintained the stance that these two "analyses," neither demonstrating economic foundation, were somehow independent, while fairly clearly demonstrating that Dr. Sumner merely took the NCC testimony and imposed a 500,000 bale demand shift.

²⁶ Other than citing congressional testimony offered by the National Cotton Council, a U.S. trade association that operates on behalf of the U.S. cotton industry.

53. Neither Brazil nor Dr. Sumner have ever offered any analysis at all as to how much or whether the export credit guarantee program actually affects exports. They took someone else's word for it, with no demonstrated economic foundation - much the same approach Brazil has asked the Panel to take with respect to important aspects of the Annex I model.

Conclusions

54. Dr. Sumner's economic analysis should not be relied upon by the Panel as credible support for any findings on the effect of challenged U.S. cotton subsidies. Brazil offers Dr. Sumner's model results as evidence that *but for* the U.S. cotton programs, U.S. cotton acreage would have declined and world prices would have increased. In order to support this claim, Brazil and Dr. Sumner had to make significant modifications to a previously well-respected econometric system. The United States has demonstrated the weakness inherent in those modifications and the failure of Brazil to independently validate those modifications. Throughout its submissions, Brazil has claimed that nebulous factors such as a producer's "anticipation of policy change" are legitimate pillars on which to base Dr. Sumner's modifications to the FAPRI model. Brazil has pushed this questionable logic despite the fact that FAPRI itself has refused to ascribe the type of impacts forced on its model by Brazil. When confronted by the United States and pointedly questioned about the particulars of its approach, Brazil has been unable to advance convincing, supportable or even consistent explanations of its analysis.

55. As stated previously, while the U.S. has demonstrated fatal flaws in Brazil's arguments on subsidy identification, causation, and its actionable subsidies claims, it is clear to the United States that *but for* the significant modification and adaptation of the FAPRI model carried out by Brazil and Dr. Sumner, acreage impacts attributed to the U.S. cotton program by that economic model would be far less than reported in Annex I. Brazil has offered nothing in its critique to change the U.S. view of the failure of Brazil's evidence to prove this aspect of its claim.