

# Effects of market price, cultivated area and price regulation on cotton production in China



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# Background



- Cotton is one of the non-edible cash crop and source of foreign currency earning in China
- Cotton produce almost every country but the primary producer consumer and exporter are China and USA, it has 1<sup>st</sup> rank
- 24 provinces out of 31 provinces produce cotton in China and 300 million Chinese peoples are involved directly or indirectly in cotton production activities (GOC 2008)
- From 1978 to 1984, cotton production of China increased steadily, reached at a level of 6.26 million metric tons (UNEP 2002)
- cotton production fluctuated from 4.1 to 5.7 million tons
- Cotton production value accounted for 13% of the added value of economy and 0.6% contributed in agricultural GDP (Stat 2015)
- In China, cotton area reached about 4219 thousand hectares, which produced 616.0 million tons of cotton in 2014

# Overview of Chinese cotton policies



- From 1949 to 1954 Chinese government carried out free marketing policy and measures such as cotton cooperation and order advancement to stabilize the cotton industry
- From 1954 to 1985, the cotton reserving plan bill was carried out
- From 1985 to 1999, Chinese government changed unified purchase and sale policy into contract transaction.
- 2000, China initiated the market reform with development. China's cotton policy transited in the market-oriented system
- In 2010 the price of cotton increased sharply at the international level, but the national level its decreased
- In March 2011 Chinese government enacted price regulation policy of cotton
- Support/target price, since 2011-2013 was implemented in Xinjiang province, start from 19,800 (2800\$) to 20400 (2987\$) Yuan/tonne
- When the price of cotton floated dramatically, the government would carry out price regulation policy



# Methodology

- The study spanned from 1990 to 2013
- Growth rate model

$$g_x = \left( \frac{X_t}{X_0} \right)^{1/t} - 1$$

$g_x$  = Geometric Average Growth Rate

$X_0$  = Initial value of variable X

$X_t$  = Final value of variable X

0 = Base Year

t = Final year



# Multi-regression model

## ❖ Equation hypothesis No1:

$$\ln Y_t = \alpha_0 + \beta_1 \ln A_t + \beta_2 \ln P_t + \varepsilon$$

$Y_t$  = current year's cotton production

$\alpha_0$  = Intercept

$A_t$  = current year's cultivated area

$\beta_1$  = coefficient of current year's cultivated area, which is expected to be above 0.

$P_t$  = current year's market price

$\beta_2$  = coefficient of current year's market price, which is expected to be above 0.

$\varepsilon$  = Error term

## ❖ Equation hypothesis No 2:

$$\ln P_t = C_1 + \beta_1 \ln P_{t-1} + \varepsilon$$

$P_t$  = current year's market price

$C_1$  = Intercept

$\beta_1$  = coefficient of previous year's market price, which is expected to be below 0.

$P_{t-1}$  = Previous year's market price

$\varepsilon$  = Error term



### ❖ Equation hypothesis No3:

$$\ln Y_t = C_2 + \beta_1 \ln A_t + \beta_2 \ln A_{t-1} + \beta_3 \ln P_{t-1} + \varepsilon$$

$y_t$  = current year's production

$C_3$  = Intercept

$\beta_1$  = coefficient of current year's area, which is expected to be above 0.

$A_t$  = current year's cultivated area

$\beta_2$  = coefficient of previous year's cultivated area, which is expected to be below 0.

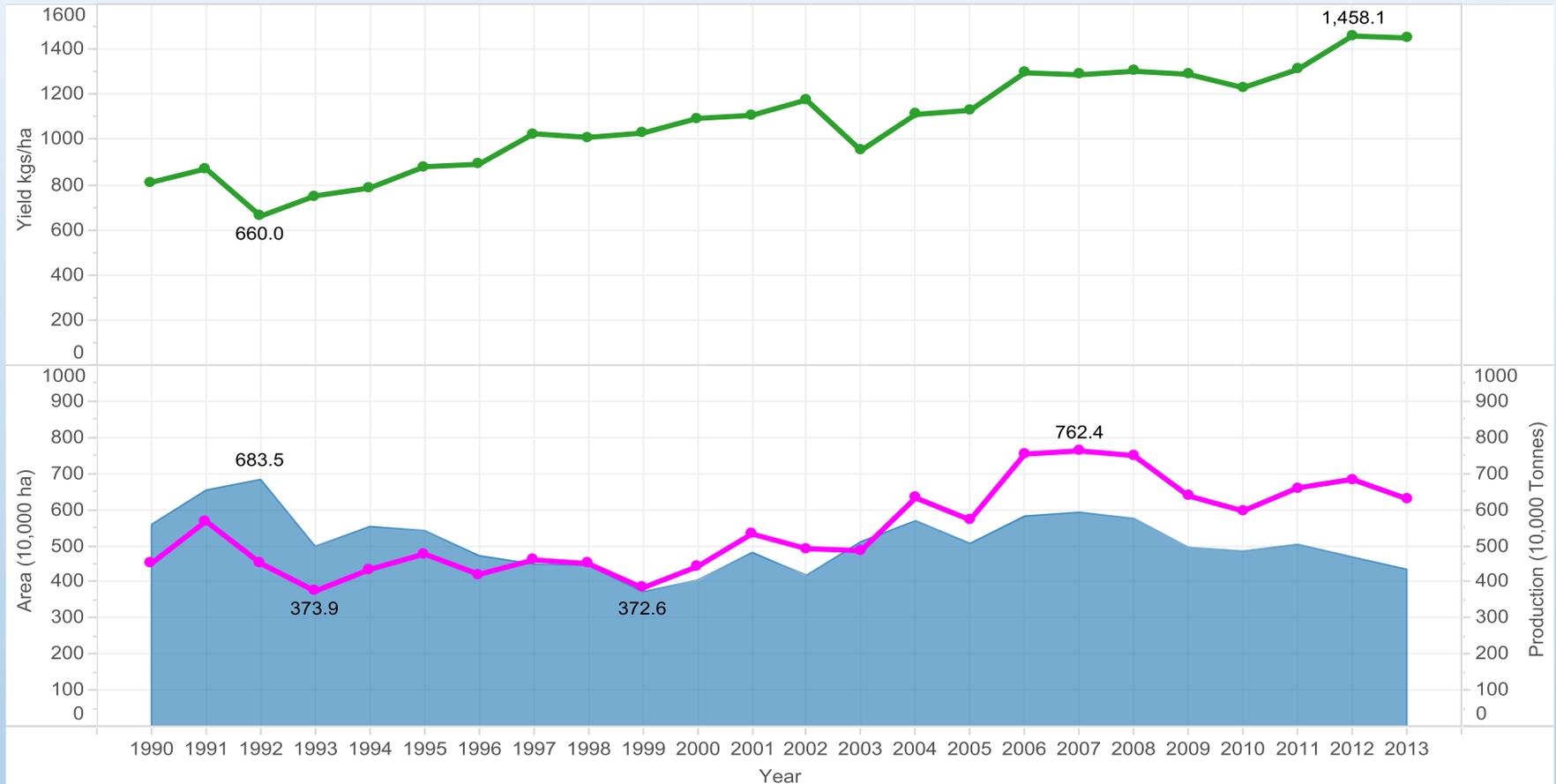
$A_{t-1}$  = previous year's cultivated area

$\beta_3$  = coefficient of previous year's market price, which is expected to be above 0.

$P_{t-1}$  = previous year's market price

$\varepsilon$  = Error term

# Cotton production, area and yield in China during the financial years 1990-2013



## Measure Names

- Area (10,000 ha)
- Production (10,000 Tonnes)
- Yield kgs/ha

# Average growth rate of cotton cultivated area, production and yield in China (1990 to 2013)



Years	Area (%)	Production (%)	Yield (%)
1990-1995	<b>9.4</b>	0.4	2.5
1996-2000	1.1	5.7	<b>4.6</b>
2001-2007	3.3	<b>6.1</b>	3.0
2008-2013	-3.7	-2.8	2.7
Average growth rate	2.2	2.3	3.2

# Impacts of current year's area and market price on production



Variables	Coefficient	Standard Error	t-test	Sig. level
Current year's production	1.873	1.021	1.833	0.081
Current Year`s Area	0.344	0.121	2.851	0.010
Current Year`s Market price	0.249	0.024	10.547	0.000
R <sup>2</sup> = 0.86,      Adj.R <sup>2</sup> = 0.85,      F-calculate= 64.68,      D.W Value= 1.81				

# Influence of previous year's market price on current year's market price



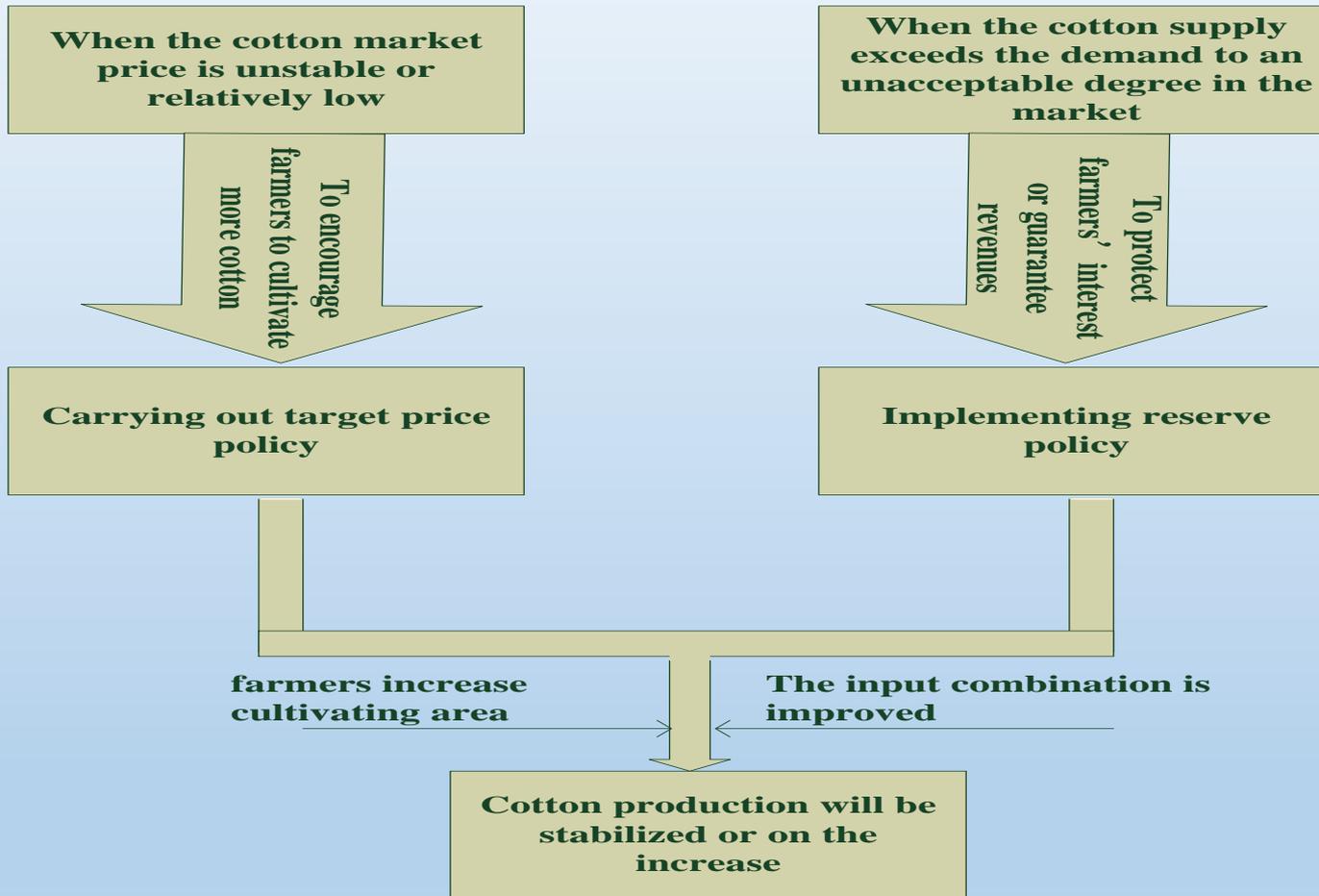
Variables	Coefficient	Standard Error	t-test	Sig. level
Current year's market price	0.491	0.453	1.082	0.291
Previous Year's Market price	0.926	0.076	12.115	0.000
R <sup>2</sup> = 0.87,		Adj.R <sup>2</sup> = 0.86,	F-calculate= 146.79,	D.W Value= 2.07

# Relationships between production and current year's area, previous year's area and market price



Variables	Coefficient	Standard Error	t-test	Sig. level
Current year's production	3.065	1.079	2.841	0.010
Current Year's Area	0.624	0.145	4.317	0.000
Previous Year's Area	-0.417	0.147	-2.834	0.010
Previous Year's Market Price	0.248	0.022	11.038	0.000
$R^2 = 0.89,$ $Adj.R^2 = 0.87,$ $F\text{-calculate} = 49.68,$ $D.W\ Value = 1.94$				

# How price regulation impacts on the cotton production





## Conclusion

- **Equation hypothesis 1:** current year's market price and cultivated area have significantly positive impacts on cotton production.
- **Equation hypothesis 2:** Previous year's market price has significantly positive impact on current year's market price.
- **Equation hypothesis 3:** Results shows that current year's cultivated area and previous year's market price exert significantly positive effects on cotton production, nevertheless, negative impact of previous year's area on production was also found.
- Apart from the regressive analysis, qualitative analysis was also made to evaluate the impacts of price regulation on cotton production, which showed price regulation had indirectly positive effects on cotton production.



# Policy recommendations

To stabilize the cotton production in China:

- On one hand, Chinese government should actively adopt price regulation policies such as target price policy and reserve policy to cope with the unexpected change of the market price, which is sustainable to protect farmers' interests;
- On the other hand, the government ought to take effective measures to protect the farmland and guarantee a reasonable land scale of cotton cultivation, which means the government should take responsibility for maintaining the cotton cultivated area within a proper range.

Thank  
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