

# Use of Market-Based Instruments for Managing Food Sector Risks in Southern Africa

## Outline

- Outline the major potential market-based instruments.
- Discuss who might use these instruments and possible strategies for use.
- Summarize advantages of market-based instruments compared to price stabilization.
- Outline the major challenges and evaluate the role for public policy in overcoming them.

## Definition

A market-based risk management instrument is any freely exchanged financial contract that allows parties on one or both sides of the exchange to reduce their risk exposure and/or alleviate its consequences.

## Examples

- Credit contracts
- Warehouse receipt systems.
- Futures and options contracts.
- Weather-based index insurance.
- Commodity-linked finance.
- Others.

# Credit Markets

- Credit is an “ex-post” coping mechanism used to:
  - Smooth consumption.
  - Reduce distress sales of assets.
- Credit markets should be viewed as the foundation of a market-based risk management strategy.

# Warehouse Receipt Systems

Warehouse receipt systems can facilitate risk management in three main ways.

1. Better access to formal credit.
2. Flexibility to market crops at different times of the year (rather than just at harvest).
3. Can act as a clearing house that enforces ownership claims and acts as an impartial third party ensuring contract performance.

## Futures and Options

- Futures allow construction of a portfolio of cash and futures positions that can significantly reduce overall portfolio risk.
- Options act like price insurance by putting a floor under losses while allowing participation in gains, at the cost of a premium.

## Index-Based Weather Insurance

- Class of financial derivatives written against deviations from “normal” rainfall (or heating or cooling-degree-day indices) constructed from objective weather records measured at secure weather station locations.
- Facilitate insurance against unusual weather events.

## Commodity-Linked Bonds

- Bonds that have principal, and possibly interest payments, linked to future realizations of a specified set of commodity prices.
- It is usually difficult to find someone willing to buy them (unless there is a substantial risk premium in the return).
- Liquidity problems.

## Potential Users

- Small-scale farmers, traders, and/or processors.
- Large-scale farmers, traders, and/or processors.
- Consuming households.
- Public food agencies, including strategic reserve managers.

# Obstacles to Small Scale Use

- Requires good access to credit.
- Often requires access to foreign exchange markets.
- Requires quick, reliable communication systems.
- Requires good market intelligence and analytical capacity.
- Contract specifications often too large for effective use by small scale operations.

# Examples of Intermediation

1. U.S. elevator system where elevators offer forward or minimum price contracts to farmers, then pool the risks, package them and hedge aggregate exposure.
2. Government program in Mexico where farmers voluntarily pay a premium to obtain a guaranteed minimum price, then the government agency pools the risks, packages them, and hedges aggregate exposure using CBOT maize and wheat option contracts

# Obstacles to Direct Government Use

- Need a physical cash position (or a *specific* cash commitment that is highly correlated with the return on a physical cash position).
- Government use can reduce the incentive for private sector participation.
- Hedging can add to risk without non-discretionary, credible, and transparent rules about the way trading gains will be used (and losses funded).

# Advantages

Advantages of market-based approach to risk management include:

- Participation is voluntary.
- Should not require large persistent government budget outlays.
- Used properly they facilitate and enhance the role of the private sector, rather than displace it.

# Challenges

1. Poorly developed transportation, communication, and market intelligence systems can limit effectiveness.
2. Lack of analytical capacity and experience.
3. Up-front transaction costs, resource requirements, and scale discourage use by small-scale operators.

# Challenges (Cont.)

4. Basis risk.
5. Price stabilization schemes and discretionary government procurement.

## Role of Public Policy

1. Investing in transportation, communication, and market intelligence systems.
2. Investing in institutions that support rural finance markets, in particular through warehouse receipt systems.
3. Investing in analytical support, technical support, and education to facilitate use.

## Role of Public Policy (Cont.)

4. Development and support of objectively measured weather indices that can provide a foundation for weather-based insurance.
5. Development and support of intermediary institutions that can facilitate use by small-scale farmers, traders, and processors.
6. Be very careful about direct government trading of these instruments, which can cause a variety of problems if not done carefully and systematically.

## Futures Trading Example

- A trader buys 100 metric tons of white maize at 500R/ton.
- The trader immediately sells 1 futures contract for white maize on SAFEX at 618R/ton.
- A month later the trader sells the maize but prices have fallen and the price received is only 480R/ton.

## Futures Example (Cont.)

- Loss on the cash position is:  
 $20 \times 100 = 2000\text{R}$  (plus any trading costs).
- But the futures price has also fallen and is now 600R/ton.
- Gain on the futures position is:  
 $18 \times 100 = 1800\text{R}$  (minus any trading costs).

## Options Trading Example

- A large scale farmer expects to produce 100 metric tons of white maize next harvest.
- The current futures price for delivery at the next harvest is 600R/ton.
- The farmer buys a put option which expires at harvest with a strike price of 600R/ton

## Options Example (Cont.)

- If prices go up before harvest the option expires worthless and the farmer has lost the option premium (5R/ton) but sold maize at a good price.
- If the price goes down the farmer sells the maize at a poor price but the option is valuable and offsets the loss (e.g. if the futures price falls to 550R/ton then the option pays off  $50 - 5 = 45$ R/ton.

# Weather Insurance Example

- For Malawi, construct a rainfall index that is highly correlated with maize yields in the Lilongwe area.
- Estimate the extent of financial loss per hectare that is associated with changes in the index:  
  
e.g. 1mm reduction below normal level is associated with a 10kg/ha yield reduction that is valued at 15 Kwacha/kg gives an overall payout of 150 Kwacha/mm of the index.

# Weather Example (Cont.)

- Set the trigger (“normal”) rainfall level as well as a maximum payout (determines the “deductible”).
- Price the insurance premium based on statistical evaluation of probability of loss.
- Find an insurer willing to offer the product (with a premium loading to cover costs and a return to non-diversifiable risk).