

## FRE 501 Lab 2, 10<sup>th</sup> Sep 2013

### The Origin of Futures Markets: An MFRE Tale

*All characters appearing in this work are fictitious.  
Any resemblance to real persons, living or dead, is purely coincidental.*

#### The Village

A long time ago in a galaxy far, far away ...

There was a small village on a warm fertile island called **Adanac**. The villagers were strong and intelligent, and traded their goods with neighbors, far and wide, and the village prospered. There were 6 key members of the village, and they each had their trade specialty.

#### The Producers: **Ari and Alex**

**Ari** was at one with the water, and no fish could escape her keen eye and strong nets. But she had a strong oneness with nature and she caught only the fish that had lived a full life. In no time, she had established a sustainable system of harvesting the abundant fish in the waters surrounding the island. Alex's ancestors had come from another land (their green fingers led to many rumors that they were from another planet) and they had brought an exotic plant with them that produced a beverage with a strong acidic flavor. They called it 'coffee'. The coffee plants on the island bloomed under Alex's care.

#### The Processors: **Brendy and Bentley**

Brendy and Bentley had both grown up in industrial cities surrounded by technology and machines. Ironically, they had ended up on the island as a result of technological failure: Brendy's natural gas-powered air balloon had run into problems during a thunderstorm. Bentley's coconut oil-powered ship had run aground when the temperatures dropped in the cold seas and the fuel solidified in the tank. When they got to the island, they gave up traveling and converted their failed machines into processing plants, and became specialists at converting the island's abundant fish and coffee into a variety of other useful products for export.

#### The Storage Specialist: **Beza**

Beza, hailing from a land of mountains, had spent his childhood hiding things in caves. One day, an earthquake in the wrong place at the wrong time caused a cave-in and buried his favorite toy. He shook his fist in disgust at the mountain and moved to the island, where he promptly discovered that his talent could be applied to storing fish and coffee, since no one could hide them better than he.

#### The Village Chief: **Harm-o-knee**

Harm-o-knee was a distinguished indigenous member of the first peoples that had settled on the island. She ruled the village with wisdom and an iron knee. Anyone who was disobedient would receive a knee to the tummy, hence her name 'harm-o-knee'. Under her rule, the village was peaceful, obedient and prosperous.

## Price Risk and Forward Contracts

After several years of production, the island's products become well known in the whole region. The growing export economy meant that fish and coffee prices were now linked to international market prices and became volatile, because not everywhere in the world had predictable weather like **Adanac**. Nobody liked the price volatility. **Ari** and **Alex** had a hard time figuring out how much to produce, **Brendy** and **Benty** had a hard time knowing how much to process. Volatile prices were just so risky for business, they all decided to ask their chief for advice.

**Harm-o-knee** advised them to enter into long-term contracts with each other, fixing both quantities and prices for several years into the future. The certainty allowed them to focus on their businesses and worry less about **price risk**. Thus, **forward contracts** were born.

**Beza** had a talent for spotting price trends, and began to take more risk by storing extra goods when prices were low and sell them when prices were high. His storage activities helped spread out supply over time, dampening the effect of supply shocks on prices.

## Default Risk from both producer and processor, Deposits and Liquidity Risk

One day, a strong hurricane struck **Adanac's** main neighbor called the United Islands, where an advanced, warlike people lived. The hurricane dumped a huge number of fish onto the United Islands, causing the **fish price to crash**. The hurricane simultaneously flooded and destroyed much of the coffee plants in the United Islands, causing **coffee prices to spike**. **Beza** was storing as much fish and selling as much coffee as he could, but even he had limits.

**Ari** was horrified, because so many fish were lost, but she was comforted by the fact that she had many sales contracts to **Benty** at high prices. But **Benty** was no fool. If he continued to pay **Ari** the high price for fish, he would be put out of business by his aggressive competitors who were literally picking up fish for free on the streets. Teary-eyed, he tore his contracts with **Ari** into two, folded them into paper flowers, and left them outside **Ari's** house with a 'sorry I default' note.

At the same time, **Brendy** started getting less coffee from **Alex** with strange explanations. On some days Alex's horse had a bad hoof, on others, his civet cat ate all the coffee. Alex did not want to honor his contracts with **Brendy** at the lower price, and he secretly diverted his coffee to **Beza** and the United Islands, where prices were 4 times higher.

**Ari** and **Brendy** were outraged that their contracts had been **defaulted on**, and they went to **Harm-o-knee**, who in her great wisdom, ruled that from that day forth, all forward contracts by **Benty** and **Alex** would require them to put up a **20% deposit**, which would be forfeit if they backed out of the contracts. She also ruled that if market prices moved more than 20% against a contract price, the benefitting member had the right to ask the losing party for an additional 20% deposit as guarantee of performance. This sudden need for cash deposits reduced the risk of members defaulting (**counterparty risk**)<sup>1</sup> but increased the risk that they could run out of cash if prices moved a lot suddenly (**liquidity risk**).

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<sup>1</sup> Counterparty Risk, Default Risk and Credit Risk all mean the same thing

## A Madon Moment: Contagion

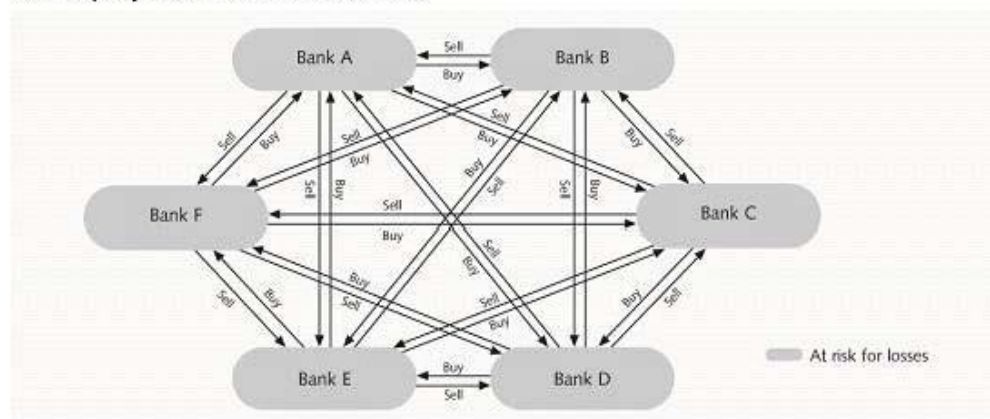
Over the next year, the long-term effects of the hurricane started to show up in coffee and fish feeding patterns. The supply became extremely erratic, and prices were equally volatile. **Beza** did many, many trades with **Ari**, **Alex**, **Brendy** and **Brent**, as they kept changing their minds about whether prices would rise or fall. **Beza** also found an apprentice called **Madon** who excelled at handling the large number of trades. In fact, he was so good at it, there always seemed to be a good profit at the end of the day. Soon, **Beza** handed most of the daily business to **Madon**, while he sipped his Mojitos and read 'Moby Dick' on the beach. Life was good.

One fine day in December, **Beza** walked back from the beach to his warehouse and could not find **Madon** anywhere. The warehouses looked strangely empty. There was supposed to be 3 times as much fish and coffee in there. **Beza** had a sick feeling in his stomach and went to the bank, where he realized that 80% of the funds had been transferred to an offshore account in Canada. He looked at the signature authorizing the transfer and alas, he learned that the true name of his employee was "**Madoff**".

**Beza** had been swindled but he was still a fighter with a good head for numbers. He looked through his warehouse and books, and realized that he could re-start his business from scratch, but he would probably have to default on all of his village friends.

**Beza** called an emergency village meeting and all six members attended. They all brought all their trading records along and together they realized that the situation was worse than they had thought. Their contracts were all different and non-standardized and this made it very difficult to work out who owed who what and how much. Some contracts were for large beans, others for small beans. Some were for adult fish, others for small fry. Some were for delivery on the 1<sup>st</sup> of the month while others were for the 15<sup>th</sup>. Some were for delivery in the warehouse on one side of the island, while other contracts were for delivery on the other side of the island. There were so many different trades with each other that it was impossible to default without a **contagion effect**<sup>2</sup>. For example, **Beza** could not default on **Ari**, without causing her to default on **Benty** and **Brendy**, who would in turn, default on others. The long string of **bi-lateral trades** with each other and meant that any single default would ripple down the line like dominos and affect everybody.

Counterparty Risk – Bilateral Settlement



OTC Derivatives: The default of firm A in an OTC derivative transaction has a possible contagion effect. It does not only affect firm F, it leaves all connected trading counterparties from firm A to F potentially at risk.

Source: [world-exchanges.org](http://world-exchanges.org)

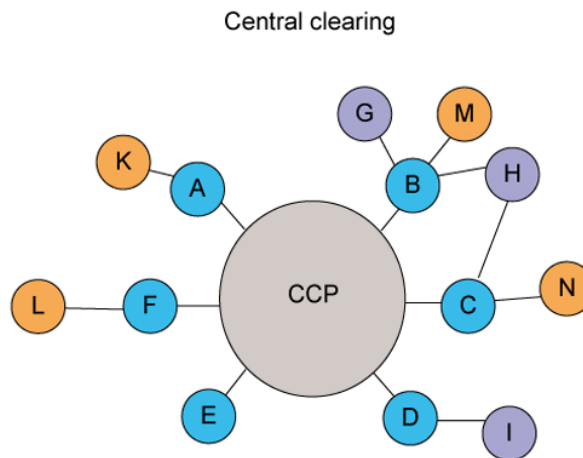
<sup>2</sup> Contagion is like the flu spreading. If one person gets it, it spreads to more and more people.

## A new Future with futures

**Harm-O-Knee** was greatly disturbed and sent everyone home while she pondered how to best salvage the situation. She knew that her village members were good at what they did, and that trading promises about the future was important for them to manage their risks in a global economy with volatile prices. She needed them to work hard instead of worrying about prices and defaults all day. She also knew that the current system would always be vulnerable to contagion when any counterparty defaulted. As she looked up at the stars and pondered the motion of the planets around the sun, an idea came to her. She would be at the center, like the sun, and she would be a central counterparty to all of them. She would be like the sunshine that would never default.

**Harm-O-Knee** made a series of broad changes to simplify the contracts and centralize the counterparty risk. Thus **Adanac's** futures exchange was born, and all the contracts would now be known as **futures**.

1. All contracts became **standardized** (delivery location, dates, and quality became fixed) – this made it easy for contracts to be offset with each other. They became :
  - a. **fungible (identical with each other, inter-changeable)**
  - b. **tradeable (can be easily sold to someone else)**
2. Each contract between buyer and seller would also be simultaneously replaced with two separate contracts, where both buyer and seller would face her as the counterparty instead of each other – this is called **Novation**. She called herself the **Central Counterparty (CCP)**. This meant that if any member defaulted, the remaining 4 members would not be affected.
3. All contracts would require a deposit as **collateral** from both buyer and seller – she called this **Margin**
  - a. This **collateral** would be forfeit if a member chose to default
  - b. She would also ask for more **collateral** when the price went against that member (**Margin Call**)
  - c. If a member refused to give her more money (**post more collateral**) against a losing trade, she could close that person's contract and keep the first deposit



One of the key features of centralized clearing is the continual demand for collateral to manage the default risk of participant members. Question: Has default risk been eliminated in this system?

**Review of Key Concepts covered in this story:**

- **3 Main Risks for economic agents to manage:**
  - Price Risk
  - Counterparty Risk
  - Liquidity Risk
- **Unmanageable risks:**
  - Risks from 'acts of God' that result in supply shocks can only be transferred but not removed from the system
- **Forward contracts are:**
  - Bilateral-traded
  - Non-standard (delivery locations, dates, quality)
  - May or may not be tradeable (will discuss OTC paper markets in class)
  - Significant counterparty risk, high contagion risk
  - Less liquidity risk (depends on negotiated terms)
- **Futures contracts are:**
  - Standardized, Fungible and Tradeable
  - Exchange-traded and Centrally cleared
  - Less counterparty risk, less contagion risk
  - Requires better cash management (more margin required and liquidity risk)