

Bubble Markets and Study of the Emu's Bubble in Texas in the 1990's

by

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ABSTRACT

This thesis presents evidence of Emu market failure in Texas in the 1990's. There are several examples of bubble markets in economics literature. The Dutch tulip market in the 17th century, the Florida land bubble in 1925, and the Emu bubble in the 1990's are just some controversial examples of such bubble markets. The paper briefly explores these bubbles, and in particular the Emu bubble and provides some explanation of what caused the bubble and why it burst. In this regard, we tried to suggest a model for the emu market crash.

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CHAPTER I INTRODUCTION

There are several examples of bubble markets and the use of this phrase in economics literature. The Dutch tulip market, the Florida land bubble in 1925, or recently the emu market in Texas are examples of such bubbles. There is a controversy among economists over the definition and use of the term bubble. Shiller and Case (2003) believe the term bubble “refers to a situation in which excessive public expectations of future price increases cause prices to be temporary elevated” [7]. In contrast some economists argue about vast usage of this term in economics literature for every inexplicable economic event. Garber (1990) believes that before applying the label bubble to an economic event, one should study all economic explanations. Moreover he refuses the label “bubble” for the Dutch tulip market and tries to explain that event by “market fundamentals” [4].

In this thesis we try to mathematize a model for the bubble in the emu market and later we will attempt to apply this model to other markets.

1.1 The Dutch Tulipmania (1634-37)

In the 17th century, the Netherlands was the heart of cultivating and growing different kinds of tulip bulbs in Europe. A decade after the tulip’s introduction to Europe in the 1560’s, rich people paid exorbitant prices for the bulbs. The tulip’s reputation as well as its price increased year by year. By the second decade of the 17th century, a vehement passion for owning the tulip brought even the middle class into the bulb market.

Garber (1989) presented the prices for different types of tulip bulbs during 1630’s, including the most precious of all, Semper Augustus [3]. In 1625, a Semper Augustus bulb was sold for 2,000 guilders (the annual salary of a skilled craftsman at the time was 300 guilders) [4]. In January 1637, the price reached 5,500 guilders at its peak value. This increasing price trend happened more or less for other types of bulbs. One should notice that these prices were just for some specified tulips which had been infected by a mosaic virus [3]. The virus produces uncommon colorful

patterns on the tulip petal, some of which judged to be beautiful. Whereas, the intact tulips sold for much lower prices. Garber (1990) explained the tulipmania with market fundamental. Almost all studies in tulipmania did not consider the fact that only rare bulbs had received very high prices. Moreover, even nowadays, when a rare and particularly beautiful tulip is developed, its original bulb is demanded at much higher prices than 30 years later. Since by reproducing the same bulb, and accumulating it, the price falls during a long period. And this is what happened in 17th century in the Netherlands. Although, we don't have prices for rare bulbs immediately after collapse, like *Semper Augustus*, but those rare bulbs traded as high as 1,000 guilders in eighteenth century, which is comparable even to the peak price for *Semper Augustus* a century earlier [3].

1.2 The Florida Land Bubble (1925-26)

Florida land boom is another example of forming and bursting the bubble. Economists usually refer the term Roaring Twenties to the 1920's chiefly because of post-war boom, automobile industry and the spreading use of electricity. In 1920's the United States was experiencing the post war era accompanied by the vast usage of automobile in the american family, and expansion of highway roads and railroad system, so people have money and time to travel and what is a better destination than the Sunshine State? Florida became the top choice for vacation of northeast and midwest people. Thus, speculators found nothing more interesting than real estate. There were many factors for florida land boom and debacle, among them, an important factor was a promise made by state to not collect the state income tax [2]. Potential investors started to buy land in florida seeking for huge profit just by selling their property at a higher price.

On the other hand, the construction of this rapid expansion was dependent to suppliers outside the area, and the material transportation relied heavily on the railway system. On August 1925, due to the congestion of train traffic, an embargo of all but perishable commodities was announced [2]. This imposition along with the increasing uncertainty of investors regarding the consistent growth of real estate, resulted from the dubiety produced by northern states' media about the boom, were some indications that are believed to denote the start of market crash. In 1927, some

banks were forced to close and called bankruptcy, and many of the real estate agencies closed their doors [10].

Like other markets in boom, people started to invest in real estates with the hope of selling their investment for higher prices in near future. Speculators rushed into Florida and invested on land, where in many cases the land that was bought was swamp or completely worthless land. The land prices got higher and higher, and more speculators were absorbed by the market. Soon enough, when constructions, urban projects, and many expansion and development plans were stopped, a disaster happened and the land and real estate prices fell to a small percentage of their peak prices.

1.3 The Texas Emu Bubble

In the 1990's, Texas was about to introduce a new meat to the family basket, The emu meat. Farmers started to invest on emu's chicks, yearlings, and breeding pairs with hope of large future gains. Speculative investors got interested in the breeder market, and soon the increasing demand for emu's breeding pair raised the prices to a higher level. Also, people with no equipment made the demand larger with purchasing a yearling, a breeding pair, or even an unhatched chick, and kept the emus in their backyard or in a farm for a cost. These escalating prices were caused by unrealistic and excessive demand for a breeder market that was not be able to build a market for trading end products – mainly, emu's meat, and oil – which was the ultimate goal of emu's market. The market failure began around 1995, and the prices for emu fell next to almost nothing. Some owners found out that loosing the birds is a better strategy than bearing the high cost of feeding them. There were many reports of wandering emus around Texas just after the market crash.

After the market failure, speculators and people left the market and many farmers switched back to the conventional livestock production. This was a unfortunate outcome for a market that was said to be the next big thing, and was believed to replace red meat in the daily diet of millions of Americans.

CHAPTER II

HOUSING MARKET BUBBLE

The area of economics and finance contains various attempts to indicate the term bubble for inflation in housing prices, in which the home prices increase rapidly beyond their real value, then crash happens and prices return to normal. During a run-up in housing prices and with speculation of large price increases, people purchase a house mostly for two reasons. First-time homebuyers enter to the housing market since they simply think if they don't buy a house in today's market, they may not afford to purchase a house in future. The another reason is speculators assume that purchasing a house at a relatively low price and selling it at much higher prices is an attracting investment with huge payback in such a short period of time. If this run-up in prices is temporary, price level will return to its reasonable value and bubble will burst.

The important fact here is when we should call a run-up in prices a bubble and when it is just a permanent rise in prices. When does a bubble burst? These are some questions that we try to find an answer for each in this thesis.

2.1 Works on Housing Bubble

Robert J. Shiller is known for his tremendous works on housing bubble and financial markets. In his 2003 paper with Case, It was mentioned the term housing bubble is relatively a new phrase which has been used in public media since 2002 [7].

Case (1986) studied 1983-85 house market boom in Boston area. His model included the causes, *fundamentals*, for inflation in housing prices in Boston mainly the construction costs, interest rate, growth in income and other fundamentals [1]. For the period 1983-1985, the model predicted an increase of 15 percent in Boston house prices, but the actual price inflation during this period was 60 percent higher than the predicted rate [1]. He concluded this unreasonable price inflation as a bubble in Boston housing market.

Shiller and Case (2003) researched house market inflation in U.S. in 2003. They refused applying the label bubble to house markets in many cities in U.S., and explained the inflation with fundamentals. They believed the income growth was the

main motivation for increase in home prices. However, they considered the boom was in part a bubble for three cities, Los Angeles, San Francisco, and Boston. A part of house market inflation in these cities was caused by high expectation of future price increases [7].

2.2 Validity of Housing Bubble

we believe that the term bubble refers to a situation where the price of a commodity with *no intrinsic value* starts to increase beyond the reasonable limits and then suddenly collapse. With this definition we try to exclude the housing market from the bubble instances, since the location (i.e. the land) and construction price of a house comprise the major part of its value.

In chapter 1 we've attempted to mention some examples of bubble besides the emu market which is explained in detail in chapter 3. All those examples refer to commodities with no intrinsic value. The Dutch Tulipmania 1634-37 is a great example of such bubble, where an intrinsically useless and worthless bulb was traded for more than \$60,000 in today's money. We believe that Florida land bubble is another example of such bubbles as in many cases the lands that were marketed were nothing else but swamps and generally worthless lands.

CHAPTER III

EMU MARKET BUBBLE

The inception of Emu trading in the United States goes back to the late 1980's, when its meat was said to be America's next red meat, a very good alternative for beef with less cholesterol and same amount of protein. However, during the first years of emu inception and early investments, it was just a breeder market. Unfortunately the end products market, which was the primary plan for investing on emus, was never established. This is the main reason of emu's market failure in Texas.

Turvey et al. divided the emu market into two different classifications, the breeder market and the end products market [8]. This is also valid for Texas emu market. At Texas there is no convincing data that shows the market for end products of emu was emerging. So we mainly focus on breeding market which Turvey et al. suggested that the breeding market is divided into three categories: breeding pairs, yearlings and chicks. [8]

The building of a supply chain for end products of any meat is not easy. As an individual investor you need to meet all the requirements of USDA which costs more than an ordinary farmer can afford. And since the investors in the market were people who were not equipped with big farms and all the equipments for slaughtering, oil gathering, or usual operation for such a market, thus they just invested and kept emus for their intrinsic values, hoped for selling their emus at higher prices in near future. A large portion of this market were formed by these groups of investors who actually were not interested in trying to establish a supply chain for emu's end products. Therefore they did not have any access to the end products market. We certainly can state one reason for failing the end products market, that was the absence of a well established retail chain. Another reason for failing the end products market was lacking of intense research and surveys about consumer's willingness to switch from their regular diet to a completely unknown meat. More importantly, cost estimating for emu's end products was fallacious or at least was not correctly anticipated. Gillespie et al. published the first paper in retail value of emu's meat in 1996, almost a decade following the emu market was emerging. For a market that once recognized by phrases such as "the most usable bird", "a true healthy replacement

for beef” and so many other expressions, rushing into the consumer market without any cost estimation was a risky and unsecured investment.

3.1 Cost Analysis for Emu Operation

We are going to focus on small farms, since substantial amount of the excessive demand for Emus was caused by speculators with no equipment, and small farms played an important role for keeping and feeding those birds. It was shown that the average total cost for a 15-hen emu farm is about \$2,300-2,400 per emu per year [5], [9]. Turvey et al. (2002) did a calculation for the estimated price of emu’s meat. Each fully grown emu can produce almost 35 pounds of dressed meat. Based on their estimation in a 15-hen emu farm, if the slaughtered meat must go to the consumer market it can be priced between \$6-14 per pound [8]. Definitely, a very high price for a meat that was considered to be an alternative for beef. This is an evidence of why the consumer market for emu’s meat could not been established, and just remained as a breeder market.

3.2 A Glimpse to Emu Price Changes in the 1990’s

The emu operation and trading in Texas started in 1989. The first emus were imported from Australia at low prices for breeding purposes. Speculators attracted to the market, and started to invest on emus, mostly for selling them at higher prices rather than for their consumer market value (such as meat, oil, or egg).

In 1993, the price for yearling emu pairs were \$12,000 to \$18,000 per pair, and the price for two year old emus were \$25,000 to \$28,000 per pair [6]. If you were going to buy an emu pair, a year later you could sell them for double the purchase price. It seems a tempting investment. More attracting prices were assigned to emu chicks, in which 3 or 4 months old chicks were priced between \$7,000 to \$9,000 per pair. Moreover, farmers who wanted to earn even higher profits, could buy a proven breeding pair for \$30,000 to \$40,000 [6].

In 1995-96, there was no more demand for the flightless bird, and signs for market failure started to appear. When the bubble imploded, the prices fell rapidly to levels that were lower than the cost of owning and feeding the emus. Some people set their birds free for preventing an additional cost to their failing high-risk investment. There

were many reports of emus wandering all over Texas.

The price for a breeding pair reached its peak at \$40,000-50,000. However, after the market crash, one could buy a breeding pair for \$200. The insanely high prices for a commodity with such a small intrinsic value only can be explained by a market mania, or in the other words a Bubble.

CHAPTER IV
MODEL

As we mentioned in chapter 3, by reason of having no or inconsiderable intrinsic value for emus we believe that the crash in the emu market was a bubble. In this chapter we try to propose a model for this bubble.

The model for the Emu market bubble consists of three difference equations, which has the following form:

$$\begin{aligned}N(t+1) &= (1 - \beta)N(t), \\I(t+1) &= I(t) + \lfloor rN(t) \rfloor, \\P(t+1) &= [N(t)^\alpha]\gamma P(t) + \mu(N(t))I(t) + \lambda(N(t)^2).\end{aligned}\tag{4.1}$$

Where the N is the number of potential investors, I is the number of actual investors, and P is the price of emu at the market at time t . All of the parameters are positive and lie between zero and one. The second term of second equation, $\lfloor rN(t) \rfloor$, is the greatest integer function which indicates a fraction of number of potential investors in time t . Also $\mu(N(t))$ is a function representing the number of potential investors, if $N(t) = 0$, then $\mu = 0$, otherwise $\mu = 1$.

We strongly believe that the total number of potential investors is fixed, and with switching to actual investors the number of potential investors shrinks to zero and that is where bubble burst and the prices suddenly collapse.

At time zero, there are few investors and the large stack of potential investors. As time goes by with advertising and with increase in trade of emerging emu market, the potential investors begin to purchase the emus, thus the number of investors, I , goes up. By transforming potential investors into actual investors and due to fixed number of the potential investors, the number of potential investors, N , shrinks. So with continuous entering of potential investors into the market and by reason of high and excessive demand, prices swell beyond to the reasonable levels. This trend proceeds until there is no potential investors left, and suddenly demand cuts off and prices collapse.

4.1 Simulations

In our simulation, the initial number of potential investors, $N(1)$, is 30,000. The number of actual investors at the beginning, $I(1)$, is 0. The initial price of a breeding pair is \$200. Our model shows that during the first 4 years of bubble, the price exponentially increases until there is no more potential investors (no demand), then at this point bubble burst, and the emu's price suddenly falls to almost nothing. This is exactly what happened in Texas in the 1990's.

Figure 4.1 shows the movement of emu's price during time. It starts from \$200 and reaches to almost \$40,000 in 4 yrs. This is a huge increase in value for an investment with a lot of uncertainty. Figure 4.2 shows a graph for number of potential investors with respect to time. At time 4, there are no potential investors left and therefore, the prices suddenly drop to zero. In the other words, at time 4, the bubble bursts.

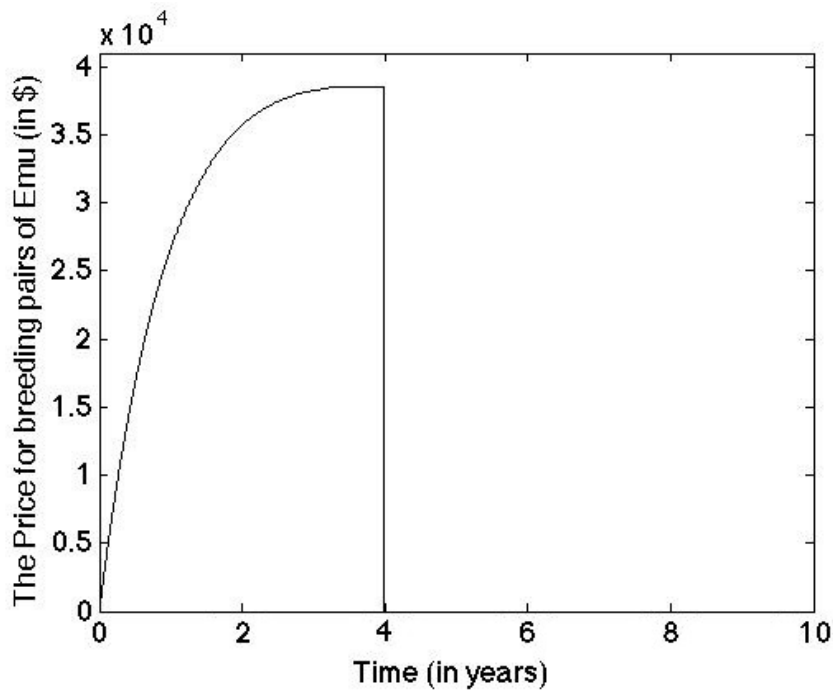


Figure 4.1: Emu's price with respect to time

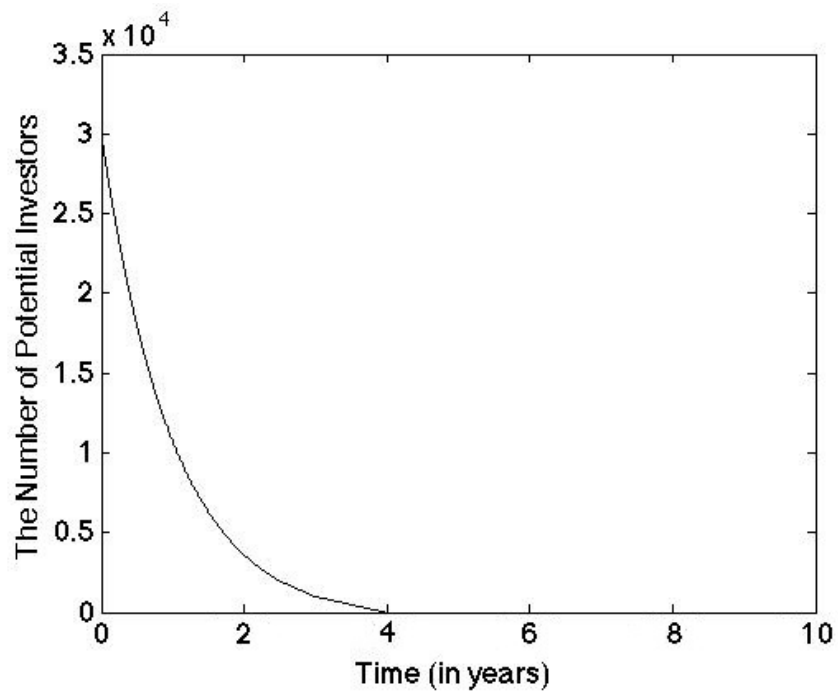


Figure 4.2: Number of potential investors with respect to time

CHAPTER V
CONCLUSION

In this paper we tried to discuss the term bubble, and state some examples of bubble markets. We explained the mania that was created for emus, a flightless bird that once was considered as the next red meat in American diet, in Texas in the 1990's. We considered this phenomenon as a bubble, and specified some reasons for emerging the bubble at early stages of the market and bursting in 1995. We suggested a model for emu's bubble and tried to simulate a market with boom-bust cycle.

The model presented in this thesis predicted the price movement for a pair of emus. It matches with the result of real data. Although, the number of emus in the United States in the 1990's can not be estimated easily (there were reports of 100,000 to 400,000 emus all over U.S. mostly in Texas), but it has small effects in our calculations. We consider the "fixed" number of potential investors as the most important factor in our model. We estimated that there are roughly around 30,000 potential investors that are or are going to be interested in a high-risk investment such as emu market.

This model can be applied to other such bubbles, in which there is a *fixed level of demand*, and a commodity with *no intrinsic or relatively small value* which is experiencing unreasonably high prices and rapid price inflation during a small period of time.

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