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Rent in an Economic Simulation

By Fred E. Foldvary

In my economics classes, I conduct an economics simulation so that students can experience being entrepreneurs, workers, bankers, government officials, customers, and citizens. This is not a computer simulation, but a real simulation with actual goods, money, and people. In typical economics textbooks, the role of land and its rent is either totally ignored or else briefly discussed in the section on how taxes reduce the social surplus. Since in reality, land is of great importance, it is a significant part of the simulation. But how can one simulate rent?

I divide the classroom into three sections of about equal size. The three districts are **poorland**, **middleland**, and **richland**. What is it that makes one area rich and the other area poor? It is the differing productivity of the areas.

- In poorland, a worker produces one unit of a good.
- In middleland, a worker produces two units.
- In richland, a worker produces three units.
- The employer is considered a worker also and also produces the same ratio of goods.

Students who are in richland are at first happy to be in this district. But later they will realize that the citizens and workers do not necessarily get this higher wealth. Since in the simulation the quality of labor is the same in all districts, and workers are free to move to any district, wages will tend to equalize. The difference is due to the productivity of the land, not the workers. So the factor that receives the greater wealth is land. The differences in productivity create differential rent, which is in fact the source of rent. But who gets that rent is up to the citizens, and it is likewise up to the student-citizens of the economic simulation.

By the rules of the simulation, poorland is rent-free. One landlord is selected randomly for middleland, and another landlord for richland. Poorland is therefore the margin of production, the least productive land in use. At the beginning of the simulation, the student-citizens enact a constitution by majority vote. **The very first issue to decide on is the land tenure. Shall the landlords keep the rent, or shall it be distributed equally among all the citizens?**

I conduct the simulation during the last week of the course, when students have learned about supply and demand, the effects of various taxes, and the role of the factors of production: land, labor, and capital goods. So **most of the time, they vote to distribute the land rent equally. But sometimes they vote to let the landlords keep it.** Why? Students who vote for landlord-kept rent say they hope to be a landlord and get rich. They might also not appreciate what happens when the landlords get all the rent. One of the purposes of the simulation is to supplement abstract book learning with a real-life experience about wages, rent, money, prices, and entrepreneurship.

For currency, I use the notes of the Monopoly game, but the money is not fiat, as it can be redeemed on demand for one Hershey's chocolate "hug" (a Hershey's chocolate "kiss" hugged by white chocolate) at a rate of $10 for one hug, and hugs can likewise be converted to currency at the same rate. Thus the currency is a commodity money. (The $500 notes of the game are treated as $5, and the $100 notes as $1.) At the close of the simulation, any currency remaining can be converted into hugs.

After enacting a constitution, students elect a council. The main role of the council government is to protect property rights. The council enacts a law prohibiting theft, set the penalty for theft, and hires one or more police officers to enforce it. The council then usually enacts taxes to pay for the police and maybe payments to the council members. What should be taxed? Often they tax the land rent, but sometimes income and sales and other transactions.

Each student is given $10 to begin with. Those who want to be bankers then establish banks that accept deposits and pay interest. Students then can volunteer to be merchant entrepreneurs. They decide which good to produce (I provide miniature chocolate bars of various types). A merchant must also decide which district to produce in, since he may only hire workers within that district. He declares how many workers he will hire, at what wage.

The rent is paid only by the merchants. If the rent is kept by the landlords, a landlord may declare any rent he wishes, so long as it is the same for all merchants. If the rent is equally distributed, the rent paid is the economic rent, which is the differential rent.

- Half the output in middleland is economic rent, since for the same amount of labor, twice as much is produced relative to poorland.

- Two-thirds of the output in richland is economic rent, since three times is produces as in poorland.

Merchants have to pay rent, wages, and also taxes if the council has enacted taxes on them. They either form partnerships or borrow funds from the banks in order to pay these costs. After selling the goods, they repay loans to the banks, including interest. They need to price the goods to cover the costs and have a profit left.

A citizen may choose to be self-employed. In poorland, a self-employed student earns one hug or $10. In middleland, his gross income is $20, and in richland it is $30. But they too are merchants who pay rent. The option of self-employment creates a natural minimum wage of $10, since that is what a self-employed person gets in poorland. This $10 wage at the margin sets the general wage level for all others. It anchors the whole economy to this wage.

When all the merchants have declared their wage offers, they hire workers. A student may only have one job, such as employee, merchant, banker, or government official. Landlording, however, is not considered a job. Wage offers have not been totally uniform, but they tend to be within some narrow range, so the workers in richland do not necessarily get paid more than those in poorland. So, what about the rent?

If the landlord keeps the rent, what happens depends on the amount of rent charged. If one landlord charges the full economic rent but another charges less than the full economic rent, all the merchants want to be located in the district where the rental paid is less than the full economic rent, since the economic rent they are not charged for becomes profit for them. Some of that rent may go to higher "wages," which is really rent given to the workers. Once all the citizens of that land are employed, merchants must then produce in other lands.

Suppose there are 30 students, 10 in each land, and there are 60 units of goods. Suppose everyone is self-employed. Then the wealth is $100 wages in poorland, $100 wages and $100 rent in middleland, and $100 wages and $200 rent in richland. There will be $300 in wages and $300 in rent. We can see that half the wealth goes to the landlords!

Landlords in this case know that they will be getting rich, and they also become the merchants. They will be paying the rent to themselves. Folks in the real world might think that company owners are rich from commerce, but in the simulation, it is clear that merchants who are also landowners get rich because they get the rent as well as profits from the enterprise.

If the economic rent is distributed equally, then income becomes equalized. If some bankers or merchants become wealthy, it is due to their initiative and entrepreneurship, not because they by chance got to be landlords.

When the workers, landlords, merchants, officials, and others have been paid, they can then buy the consumer goods. The merchants declare their prices, and student-customers buy the goods, which they can then consume.

The simulation enables students to better learn the roles of economic actors: entrepreneurs, governors, employees, consumers, bankers. They can better appreciate how wages, interest rates, and prices are set. They also can experience the role of rent. **If the landlords keep the rent, they see how much of the wealth has gone to the landlords, who then often also become the merchants and get even richer. If the rent is distributed equally, they see how the differing productivity does not go to workers but to land rent, which they all benefit from.**

You can do this simulation yourself if you can get 20 or more participants.

It's an enjoyable way to teach economics. Host an economics party, where the goodies are distributed by the simulation. If you teach economics, you could do this twice, once at the beginning of the course and again at the end. See how the participants choose to distribute the rent. Go to the link above for more details, and feel free to consult with me if you have any questions. Have some fun, and learn some economics!

-- Fred Foldvary

http://www.foldvary.net/works/ecsim.html

Classroom Economics Simulation

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Abstract

I describe in this paper an economic simulation which I conduct in some of my principles of economics classes. The game attempts to simulate a market economy using goods and money. Students can choose their roles as landlords, merchants, bankers, employees, and government officials. The classroom is divided into three districts: Richland, Middleland, and Poorland, each with a corresponding productivity of labor. Students in their role as citizens adopt a constitution and elect a government that is responsible for laws, such as the protection of property rights, and the corresponding public revenue and law enforcement. The instructor acts as a higher-level governor, appointing students to record the activity and manage the currency.

Each student is initially provided with $20. The merchants make decisions as to what goods to sell, where to make and sell the goods, how much to produce, what wage to pay, and what price to charge. Bankers set interest rates for deposits and borrowing. The results are highly dependent on the rules of the simulation. After the simulation, students write a report on the experience. As a spontaneous order, the simulations are different each time they are played; there are many "side deals" among the players, and sometimes theft and corruption. The response has been very positive for most students, who report a better appreciation of the role of entrepreneurship and governance, and how wages and prices are set in the market.

Introduction

I teach the principles of microeconomics and macroeconomics courses at Santa Clara University, California. The class size has ranged from 40 to 50 students. A few years ago, I began including an economics game that simulates an economy. Students learn price theory in microeconomics and the role of money and banking in macroeconomics, but this is book knowledge. How does it work, how is it actually experienced, in practice? The simulation is an attempt to have students experience the market process and its relation to government, so they can apply and better appreciate their book and lecture learning.

One thing I learned early was to call it a "simulation" rather than a "game," as students treat the former more seriously. I provide the students with an outline of the simulation the classroom day prior to initiating it (Appendix A). The outline is also available at the class Internet web site from the day the class begins, for those who wish to look ahead. No preparation is required other than to read the outline.

Every game has payoffs, and the payoffs of the economic simulations are consumer goods, learning, and fun.

The role of the king

Every economy operates within a legal infrastructure, and in the simulation, there are two levels of governance. The students elect the lower level, while the instructor is the higher level governor, setting the structure and fundamental

rules. My role is that of a constitutional monarch, and I refer to myself as the king. The laws decreed by the king are:

1) It is forbidden to steal from the king. Anyone who steals the property of the king will forfeit all gains and be expelled from the simulation.

2) Only currency generated within the simulation may be used.

3) Citizens must obey the law enforcement of their elected council. The penalty for violations is set by the council, but the council's police are considered to also be agents of the king.

4) A citizen may only have one productive job at a time. The job rule excludes land lording. For partnerships, one partner is assigned to be the head partner, which is a job.

5) The citizens will enact a constitution and elect a council to govern acts among the citizens.

Land and technology

The productivity of the economy due to technology and natural resources is simulated by dividing the class into three districts: Poorland, Middleland, and Richland. The districts are roughly equal in size (number of seats). In Poorland, each worker, including the merchant employer, produces one unit of a good. In Middleland, one worker produces two units. In Richland, a worker produces three units. Poorland is rent-free, while one landlord will be selected for Middleland, and one for Richland.

(After dividing the classroom into the districts, I tell students they are free to move to any district. Very few, usually none, move at that time, even though the students in Poorland are a bit dismayed at being in that district. Since they may move later, they evidently wait to see the impact of the differing productivity. This demonstrates inertia; there is a minor cost to moving, while the gain is uncertain.)

The currency

For currency, I use the notes of the Monopoly game, which can be bought at toy stores separately from the game. The highest Monopoly-money note is $500, and I decree that since such a high denomination is not needed, the $500 note is to be treated as $5. If the simulation extends more than one day, there is a possibility that a student will bring in his own Monopoly money as counterfeit currency. As noted above, the king decrees that only money generated within the simulation may be used. However, in one simulation, a student who had quite a lot of money admitted he had brought in his own Monopoly money. That is the only incident that I know of that a student had violated the currency rule.

The currency is not fiat, as it can be redeemed on demand for one Hershey's chocolate "hug" (a Hershey's chocolate "kiss" hugged by white chocolate) at a rate of $10 for one hug, and hugs can likewise be converted to currency at the same rate. Thus the currency is a commodity money. At the close of the simulation, any currency remaining can be converted into hugs.

When I first did the simulation, the Monopoly money was fiat, and at the close of the simulation, the fiat money would be worthless; any leftover currency would be returned to the instructor. The result is what theory would predict: hyperinflation; students sought to exchange currency for goods, but sellers had little incentive to sell them. This problem is solved with commodity currency, since the notes are money substitutes for hugs.

Each student as citizen is to be given $20 at the beginning of the simulation. This represents the money supply as well as past savings (the king also pays wages to his officers from his funds, which adds to the money supply).

When I first ran the simulations, the initial currency was zero, most of the currency being generated by banks borrowing from the king's bank, just as in the real economy, banks can borrow from the Federal Reserve Banks. The banks would then lend money to merchants, who would then pay workers, landlords, and taxes. This led some bankers to borrow and then fail to pay back the funds by the end of the simulation, with no penalty for doing so. In my simulations now, there is no borrowing from the king' bank, and thus any subsequent expansion of the money supply is either from producing hugs or by the issue of private bank notes.

Employment

To simulate the scarcity of labor, each citizen may only have one productive job at a time. Each student is given a labor certificate, a piece of paper depicting labor (taken from clipart). A citizen may choose to be self-employed and produce one, two, or three hugs, depending on the district he is located in. There is thus no reason why any citizen would be unemployed, unless due to laws set by the council.

At the beginning of the simulation, the king hires three employees. The "king's banker" manages and safeguards the Monopoly money. He or she distributes the initial $20 to the citizens. The king's banker also changes money for the private banks, charging $1 for each transaction. But the king's banker does not engage in any retain services; everyone else deals with the private banks. The "secretary of state" records the activity of the simulation, and at the end of the simulation, gives this written record to the instructor. The "press secretary" writes information on the blackboard. These are jobs, and are paid the average wage or higher by the king's baker.

The land rent

The next step is to adopt a constitution by which the council is elected, and which may constrain its legislation. The first constitutional choice affects the land tenure, i.e. the ownership of the land rent. There are three possibilities: 1) the landlord keeps all the rent; 2) the rent is shared by those in the district; 3) the rent is distributed equally to all citizens.

The simulation also acts as an experiment to learn what choices students make. I am interested in how the students will choose to treat the rent, which is a consequence of the differing productivity of the districts. At first, I only offered options 1 and 3, but in one simulation a student suggested option 2. But in that case, the choice is always #2, showing how people vote in favor of their own economic interest, rather than the more egalitarian choice to share the rent equally for the whole class. With students equally divided among the districts, the majority live in positive-rent districts, and it is in their interest to get the most rent by keeping it within the district rather than sharing it with those in Poorland, where the rent is zero. Since this outcome is predictable, I will no longer offer option #2.

When students vote for #1, the landlord keeping the rent, and I ask for the reason why, they say that there is a chance that they will be a landlord, in which case they would like to keep the rent. But usually, given a choice of #1 and #3, the decision is to share the rent equally, since the students voting for this option realize the probability of their being a landlord is low.

Whatever the choice, students learn that one important reason for the unequal distribution of income stems from an unequal ownership of the rent. When they choose to have the landlords keep the rent, the landlords become rich, and they often also invest their money to become merchants or partners of merchants, becoming even richer.

The constitution

Before electing a council, the citizens need to enact a constitution that sets the rules for the election and governance. I give them the choice, by majority vote, of electing council members by districts or else by the whole class. This choice has no predictable outcome; students evidently have no prior knowledge or opinion about the two methods, and about half the time choose one or the other. Sometimes, some students realize the implication, and those in richland vote to hold elections by district, to ensure representation of their more wealthy area, and the votes in richland are sufficient to sway the election towards voting by district. If the council is dominated by representatives from Poorland, they could vote to tax the wealth in Richland and Middleland. But few students are astute enough to see that far ahead.

I then invite the citizens to propose other constitutional rules. I remind them that once the council is elected, they will have the power to tax and restrict, unless constrained by constitutional rules. They can also have a constitutional vote after the council is elected upon a petition to the king with the signatures of over 20 percent of the citizens.

The council

When I first conducted the simulations, I would always include an elected council. Then I decided to let the students choose whether to have an elected government. In one case, they chose not to have any government. The result was rampant theft. Some students realized that there was no penalty for theft, and, for fun if not greed, they grabbed money from the desks of other students. Most students kept their money on their desk, which made it easy to steal.

Subsequently, some merchants would not pay workers, borrowers would not pay back loans, and the whole economy degenerated into chaos. Students leaned that a market economy requires a legal structure, with laws and law enforcement. This could be done privately with security services and a network of contractual agreements, but the simulation does not provide enough time for this to develop, and students are not sufficiently sophisticated to set this up at the beginning, so I have henceforth required an elected council. Just having a law prohibiting theft and officers prepared to enforce it is usually sufficient to prevent large-scale theft and cheating, although there is usually some theft despite the law, as in the real world. There are usually some students who consider it fun to try to steal money or goods from others.

The king conducts the election of three council members. I explain that the purpose of their elected government is to protect their property rights and to provide whatever rules and public goods they think are beneficial to society. I tell the students that in past simulations, theft has taken place, and the king is only concerned with his own property; it is up to the citizens individually or collectively to safeguard their property, but the king will help enforce whatever laws the council enacts.

I invite students to nominate themselves as candidates. In all cases, few students choose to nominate themselves. This illustrates that most people prefer to be passive in the affairs of governance. In some cases, there were only three candidates, who automatically became the council. When there are more than three candidates, I invite them to give a campaign speech on why she should be elected.

When the council is elected, they come to the front of the class to elect one of their members as president, and to decide what laws they should enact. They typically pass a law prohibiting theft. But then they have to come up with a penalty and enforcement. Often they decide that the penalty will be the forfeiture of the stolen money plus a fine. They sometimes create a paid position of police officer. The press secretary writes the laws on the blackboard so they are visible to all citizens.

In the simulations, the councils have enacted a wide variety of taxes. Some have at first attempted a graduated income tax, sales tax, or a tax on the rent. After finding that a complex income tax structure or a sales tax creates high transaction costs in time and effort, and induces tax evasion, the councils responded by simplifying the tax structure.

When representatives from Poorland dominate the council, they impose high taxes on the profits of merchants. When the council is dominated by representatives from Richland, taxes are low or placed on sales. Again, people vote in accord with their own economic interest.

If the council enacts taxes, they usually also vote to pay themselves a wage. In that case, most of the tax money is spent on wages for the council members. Students then later report that the council members did little good for the society but mainly enriched themselves.

The students, like society in the real world, face the difficult problem of optimal laws and enforcement. Too little governance results in much theft, but there is also the danger of the government becoming the exploiter. That, I explain, is why there also needs to be constitutional rules that limit the power of government, and the citizens also need to be watchful of what their representatives do.

The council members may be recalled by a petition to the king of ten percent of the citizens. In one case, after levying high taxes and deciding to also be the jury in cases of theft, a petition was presented to the king, and there was a new election, which replaced the council members.

The bankers

The next step is to establish banks. Any citizen can choose to be a banker, which is a job, and thus a banker cannot also be a merchant or have another paid job. (I jokingly tell students if they become a banker or merchant in the simulation, they could put in their résumé that they have experience as a banker or entrepreneur.) If the bank is a partnership, then one partner is the main partner, and has the job of banker, and the other partner may have a job elsewhere. The banker declares the name of his bank, which is written on the blackboard.

The bankers declare what interest rate they offer depositors; the king's press secretary notes these on the blackboard. Typically they offer interest rates such as three percent. Most students, however, choose not to deposit their cash in the banks. They explain, when asked, that the interest offered is too low to be worth it. They are also concerned about the safety of their funds in the banks. The successful bankers realize this, and raise the interest offered to five percent or higher, since they need deposits in order to make loans and profits.

The success of a banker is highly dependent on his personal efforts to recruit deposits. Typically, there are two or three banks, and with three banks, later the banker with the least business usually shuts down due to lack of business. If there is only one bank, he sets a high rate of interest for loans, and another citizen soon sets up a competing bank, which reduces the rate. Thus competition works in banking as indicated by theory, a duopoly being optimal for the simulation.

Bankers are provided with sticky notes for receipts for deposits. I let them know that if they wish, they can use these also to write and issue bank notes for borrowings or withdrawals. Unless the council restricts it, the economy thus has "free banking," i.e. free-market banking with the money supply expandable by the issuing of notes by the private banks, since the function of the king's bank is only to change money.

The landlords

I have a die with 20 faces which I roll twice or thrice to randomly get a number up to the size of the class. I have a roster of students where each student is numbered sequentially. The number obtained by the roll of the die determines which student is a landlord. (As noted above, land lording is not considered a job, so a landlord can also be employed.) I first obtain a landlord for Middleland, and then a landlord for Richland. Rent is only paid by merchants and the self-employed, whose productivity is a function of which district they are located in.

There are several different ways in which the rent can be set. The economic rent is the difference in the output of a merchant relative to the output in Poorland. If the rent is distributed by land-tenure option #2, kept by those within a district, then the rent is set equal to the economic rent, thus taking half the production in Middleland and two-thirds that of Richland. If the rent is distributed to all equally, the rent is also set at the economic rent. The landlords keep ten percent of the rent as their collection fee. For options #2 and #3, the landlords collect rent from the merchants and deliver it to the council president for distribution to the citizens.

For option #1, the landlord is free to set whatever rent he chooses, so long as the rental rules are equal for all merchants and the self-employed, unless further restricted by the council. The council may also choose to tax a portion of this rent. The landlord declares what the rent is for merchants and the self-employed. It can be an amount of dollars or it can be in proportion to the output. The rent can be changed at any time.

Landlords sometimes set their rents at less than the economic rent, not wanting to appear too greedy. If one landlord sets a rent lower than the other relative to the economic rent, the merchants choose to locate in that district until the labor supply is exhausted, thus in effect also profiting from the rent. Students thus learn the effects of the land tenure system and of the rents set by landlords. The effects of rent and its collection thus have a major impact on economic outcomes, something little appreciated in conventional economics textbooks.

If the rent is equally distributed to all citizens, of if the landlords collect the full economic rent, then the effect is that a merchant is indifferent as to where to locate, since after paying rent, if the wages are equal in all districts, then the profits from production are also equal.

The merchants as entrepreneurs

I invite students to set up enterprises such as insurance firms, security services, or futures contractors. One council chose to hire a private security service rather than have its own police officer. Usually, there are no insurance firms or futures contracts. The classroom population is probably too small for there to be an effective market for insurance against theft, since the company would need to attract investors, and the investment is risky. There is too much uncertainty for futures contacts to be established.

The main opportunity for entrepreneurship is to become a merchant, to produce and sell consumer goods. Most of the goods I supply are miniature chocolate bars, including Snickers, Doves, and Hershey's bars. Snickers are the most popular. There are also Hershey's kisses and hugs for the self-employed. For those who don't care for chocolates, I offer sticks of gum, marbles and small shiny stones. The goods need to be sanitary and inexpensive.

To see what is preferred, I ask who likes the various goods, so potential merchants can see gauge the potential demand. Students are informed that if there are no merchants, there will be no goods. The role of the entrepreneur is the main lesson to be learned from the simulation. The merchant must make several economic decisions. The entrepreneur must publicly declare which good he produces, which district he is located in, how many workers he hires, what wage he will pay, and the price of the good (which he may change at any time). These are all written on the blackboard.

The simulation has a natural minimum wage, what a self-employed firm would earn in Poorland, namely one hug or $10. Yet sometimes merchants offer a wage lower than that, and it is accepted. The student explains that they have a personal relationship. Other times, there are no workers even at $10, and the merchant has to offer a higher wage.

The merchant thus has to calculate what the probable selling price will be, what his expenses will be (including wages, interest, rent, and taxes), and what profit he is likely to make. Students learn to appreciate the uncertainty in which the entrepreneur operates, which is also the source of his economic profit. The employees must be located in the district in which the merchant operates. Before getting the goods, he must actually hire specific workers (from

whom he obtains the labor certificate) and pay them, and if the rent is a fixed amount of dollars, he must also pay rent. If there is an income tax, it is collected from workers when paid. Once the labor supply of a district is exhausted, no new firms can be established. Hence, one ultimate limit to production is the supply of labor.

To pay workers and possibly rent, the merchant requires funds. Merchants can use their initial $20 for a small enterprise, but for a larger scale, they need to form partnerships or borrow from the banks. (They could form a corporation and issue stock, but there is no evident advantage to this over partnerships in the small scale of the simulation.) The banks declare what interest they charge for loans, which is inscribed on the board, the rates subject to change at any time.

Some merchants form partnerships of two or three, and some borrow funds from the banks. They often form partnerships with students who are friends. Each firm is given a name, which the press secretary writes on the blackboard, along with the product, location, price and quantity of the good, the wage offered, and the names of the employees. No production takes place until all who wish to be merchants have established their firms by declaring these variables.

The merchants then offer their goods for sale. If there is a sales tax, the tax collectors are responsible for monitoring sales and collecting the tax. Transactions require changing money, for which the bankers charge a commission. While the secretary of state tries to record the prices of the transactions, not all are captured, as there are always deals being made that are not declared and written on the board. In some cases, no goods are bought, and the merchant lowers the price. The merchants are required to offer all their goods to the public; if a merchant wants to keep the good, he must buy it from himself just as someone else would.

If the council has funds remaining after paying wages, it is distributed to the citizens as cash or in goods, depending on what they voted on earlier.

There is often a great deal of activity, accompanied by noise as merchants and customers call out bids and offers. There is usually some price discrimination, friends offered goods at lower prices or as gifts. There is a spontaneous order, which can appear somewhat disorderly! Students generally find this key stage of the simulation to be a lot of fun.

When a merchant has sold his goods, if the rent is paid in proportion to sales, he pays rent to the landlords. After all the rent has been paid, if the land tenure requires distribution, the landlord distributes it, keeping ten percent. If the rent is taxed, the landlord pays the tax collector. The merchants then calculate their profit, and pay taxes if there is an income tax. Taxes are also collected from bankers, if profits or transactions are taxed. (I remind entrepreneurs that their economic profit is their accounting profit minus the opportunity cost, i.e. the wage they could earn if self-employed.) If there is a tax on wages, profits, sales, or transactions, the students realize the excess burden this creates, and how such taxes are evaded.

When the merchants have sold all their goods, then the citizens may redeem their remaining cash for hugs at the $10/hug rate. If they prefer other goods, I exchange them for $20 each. I then obtain the write-up from the secretary of state, or later if she offers to type it. I ask questions about various activities, and there is a class discussion about the simulation. Students then write a report on their experience and how the simulation relates to economic theory.

Results

The simulation enables students to better learn the roles of economic actors (entrepreneurs, governors, employees, consumers, bankers) and the process of supply and demand, profit and loss, by actually experiencing it. The also see how the relatively few who wish to be governors or entrepreneurs drive the economic process. The invisible hand of the market works through very visible actors, each having to weigh costs and benefits for an uncertain future. Students learn that it is not easy to make economic calculations and decisions. Behind the appearance of clean static

lines of blackboard supply and demand is the reality of dynamic trials and errors. Personal relationships and entrepreneurial error make prices deviate from what income maximization would predict as utility is gained in non-monied ways. Students also learn to appreciate the difficulty of structuring governance so that it prevents theft without itself becoming the thief.

Most students report that they learned from and enjoyed the simulation, and that the outcomes are in accord with the theory they learned. Since various students learn in different ways, the classroom economic simulation offers a third way to learn, complementing the book-lecture method and the abstract-doing method of problem sets and exams.

I too have learned from the simulation. I have learned to appreciate that it is a delicate task to set the parameters of an economic simulation. Inadequate rules for the money supply, rent, or governance can corrupt the simulation, leading to theft, stagnation, or hyperinflation. The king needs the wisdom not only of theory but also what comes from experience. I hope my experience will aid other such classroom economic experiments and that we can subsequently learn teaching as well as economic lessons from them.