Wealth Distribution and Imperfect Factor Markets: A Classroom Experiment

Denise L. Stanley

Abstract: The author presents a simple exercise to demonstrate how initial property distribution can affect final wealth patterns in developing areas of the world. The simulation is a variant of the Monopoly board game in which students role play different members of a market in which they each face different rules of credit access and salary patterns. The property distribution and new mortgage rules reflect the reality of many developing areas. The simulation can be completed in one full class period and has proven successful in making students more sensitive to wealth distribution issues. Students have suggested several variations of this simulation to make it applicable across more settings.

Key words: market institutions, Monopoly, wealth distribution

JEL codes: A22, D31, 017

Monopoly can be considered the “American pastime” of board games. It is the game consisting of equal opportunity real estate. The situation involves perfect competition where everyone is given the same amount of money and has the same options of buying and selling land. What if, however, the players were not equal?

Student essay

Undergraduate students have little exposure to the dynamics of rural economies in developing countries or the general determinants of personal

Denise L. Stanley is an assistant professor in the Department of Economics at California State University, Fullerton (e-mail: dstanley@fullerton.edu). The author appreciates the assistance of all the students taking Economics 323 at the University of Tennessee between the spring 1996 and fall 1998 semesters, as well as the helpful comments of Michael Carter, Jon Jonakin, and Stephen Stewart.

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wealth distribution. Providing an understanding of the importance of land and wealth distribution is an important goal of courses in development, regional, and public economics. Visual media may complement lectures, but few exercises involving student participation have been designed. The incorporation of literary works in undergraduate economics classes is increasingly popular (Kish-Goodling 1998), but board games have not yet been tapped.

In the spirit of the Starpower simulation (Humphrey 1970; Williams 1993), I offer an exercise using the Monopoly board game as a means of illuminating the dynamics of wealth distribution to students. The growth of the Web has led to a renewed interest in Monopoly and the best strategies of play (Collins 1998), and other disciplines have used this board game as a teaching tool (Knechel 1992). Monopoly can also demonstrate several economics principles. In the original game, the principles of mutually beneficial market exchange and monopoly profit are present. Although much of the play focuses on the fixed rental payments for short-term property use, the monopoly aspect of property ownership also creates different marginal returns from an extra property title. Player equality is an important underlying assumption. Winning the game, in terms of accumulating the most final wealth, stems from player luck and skill. All players start with the same salary and mortgage rules; in the short version, property titles may be divided equally to speed up play.

My classroom simulation is a variant of the Monopoly board game that imposes different starting points and factor access to facilitate the teaching of upper-level economics concepts. Students play the roles of low-, middle-, and upper-ranked members of a society in which property matters. The game is fun and serves three pedagogical purposes. First, the effect of initial endowments on final wealth distribution is highlighted. Students learn that in some societies starting points matter because wealth trajectories may be path dependent.1 Second, students gain a better understanding of how noncompetitive markets operate. The reality of differential capital access (common in many poorer countries, as well as some regions of the United States) is a vague concept for students that is made real when they must follow a stated rule along this line. This differential access to credit and emergency funds can determine how a player reacts to bad luck, and, ultimately, how shocks have permanent wealth implications for the poor. Finally, the high social costs of monopoly are made more evident in the simulation. Here, the monopoly rents charged by one player often lead another into bankruptcy.

Following the presentation of the simulation rules and design, I introduce the structure of endowments based on typical developing country realities. Then I discuss how students have integrated the simulation exercise into their learning and how students have evaluated the simulation. Finally, I suggest some improvements and extensions that may be useful for future play and instructional flexibility.

**THE SIMULATION**

The simulation involves assigning students the role of a L (low), M (middle), or U (upper) player, with specified endowments and special rules for the course of

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play. Students play the game after a series of lectures on property distribution and land reforms in developing countries. Students are given the original Monopoly rules, a typical game sheet to complete, and a simulation outline in a class or two prior to the actual day of the exercise (see Appendixes A and B). I sort out the property titles and starting wealth in the game boxes prior to class, and I normally open the class with introductory comments to review the rules. Students start the simulation directly by rolling the dice to assign player type. Generally, I allow four students to play per table, and I assign students with the lowest roll as the U player. A class size of 40 students playing at 10 tables is the maximum for one instructor to monitor; however, larger numbers may be possible with on-line play.2

Play proceeds along the lines of the normal Monopoly game, with students landing on properties, paying or receiving property rent, and accumulating wealth. I move among the different tables to answer questions and help students fill out the game sheets. In particular, students must be careful to receive the assigned salary levels upon passing GO and follow the different rules for mortgage credit access. The class period is divided into roughly three sections of play: a section with the initial endowments and regular property purchases, a section in which the remaining titles are available for auction, and a final section of an “open land market” in which players can swap and sell their properties under any negotiated terms. Students play until one person goes bankrupt, after which they tally up their final wealth levels on the back of the game sheet. I run the simulation during a 75-minute class period, and in nearly all cases, the students have finished playing during this time.

Game performance is only part of the nonlinear payoff structure. I base the primary component of the students’ simulation grade upon their understanding of the dynamics involved. This involves a written exercise guided by three underlying questions (Appendix A). The students tend to play competitively from the start, and rational self-interest to maximize wealth is evident. I remind students to treat each game turn as a real market transaction, and I announce a reward to ensure they take the game seriously. I make extra-credit points available to the students who are the highest L, M, or U player in the class. Many L students realize they cannot win against the other players at their table, but by ranking students across the tables by relative performance, I instill an incentive for worthwhile play. Although the extra-credit points are based partially on luck, a strong level of skill is still important.3

NEW RULES FOR ECONOMIC REALISM

I describe the way I assign property, salary, and credit to the different players in Table 1. The changes explicitly demonstrate how different institutions influence how players can participate in the market. The table can reflect both international and domestic settings. Given the end of land reform in many developing countries, rural people are increasingly participating in these types of imperfect land markets for the acquisition and sale of property.4 And some U.S. real estate markets exhibit the pattern of Table 1 when credit access is varied along racial or gender lines.

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The U player in the class simulation follows the original rules of Monopoly as a typical upper-middle class market participant in the United States. As in the shortened version, some property initially goes to this player; I give him or her good properties and an initial monopoly. The middle-class player also gets some property and a near monopoly, a decent salary, and mortgage access (with interest). The L players start with the poor quality properties, a lower salary, and no credit access.

Do these changed rules reflect near reality? The different property assignments clearly show inherited wealth and how different classes of society possess different quantities and qualities of land. The unequal distribution of land in develop-

TABLE 1
Initial Player Endowments

<table>
<thead>
<tr>
<th>Type</th>
<th>Cash</th>
<th>Property</th>
<th>Land value</th>
<th>Total wealth</th>
<th>Salary</th>
<th>Credit access</th>
</tr>
</thead>
<tbody>
<tr>
<td>L–lower</td>
<td>375</td>
<td>Mediterranean, Vermont, St. Charles</td>
<td>300</td>
<td>675</td>
<td>50</td>
<td>No bank mortgages</td>
</tr>
<tr>
<td>L–lower</td>
<td>375</td>
<td>Baltic, Oriental, States</td>
<td>300</td>
<td>675</td>
<td>50</td>
<td>No bank mortgages</td>
</tr>
<tr>
<td>M–middle</td>
<td>750</td>
<td>Virginia, Tennessee, New York, B&amp;O and Penn RR, Electric Co.</td>
<td>1,090</td>
<td>1,840</td>
<td>100</td>
<td>Mortgage from bank at 1/2 value; interest 10%/turn</td>
</tr>
<tr>
<td>U–upper</td>
<td>1,500</td>
<td>Connecticut, Illinois, Marvin Gardens, Pacific, Penn, Park Place, Broadway, Short Line RR</td>
<td>2,210</td>
<td>3,710</td>
<td>200</td>
<td>Mortgage rule as original game (1/2 value)</td>
</tr>
<tr>
<td>Bank/state</td>
<td></td>
<td>Unsold public lands: St. James, Kentucky, Indiana, Atlantic, Ventnor, N. Carolina, Waterworks, Reading</td>
<td>1,790</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 2
Latin American Land Distribution by Farm Size (percentage), early 1970s

<table>
<thead>
<tr>
<th>Farm size</th>
<th>Brazil</th>
<th>Colombia</th>
<th>Costa Rica</th>
<th>Guatemala</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest class (&lt; 5 hectares)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farms</td>
<td>26.8</td>
<td>59.6</td>
<td>42.8</td>
<td>87.4</td>
<td>51.2</td>
</tr>
<tr>
<td>Area</td>
<td>1.3</td>
<td>3.7</td>
<td>1.9</td>
<td>18.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Highest class (≥ 1,000 has.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farms</td>
<td>0.8</td>
<td>0.3</td>
<td>0.4</td>
<td>14.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Area</td>
<td>29.5</td>
<td>30.4</td>
<td>25.1</td>
<td>26.0</td>
<td>76.1</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>0.84</td>
<td>0.86</td>
<td>0.83</td>
<td>0.85</td>
<td></td>
</tr>
</tbody>
</table>

oping countries is close to that in Table 1, and Table 2 provides evidence of land distribution in several Latin American countries. In my variation of Monopoly, the initial distribution of private wealth among the four players at a table gives a Gini statistic of 0.37, as the ratio of the wealthiest to the poorest was 5.2. Thus Table 1 actually is less extreme than the real-life distribution.

The different salaries reflect player earnings. Although human capital is not explicitly a part of the game, education levels often vary by endowment class, so poorer groups earn lower salaries. In many developing countries, school enrollment ratios are positively related to income, with higher rates of illiteracy among the poorest groups (Gillis et al. 1996, 254).

The property rents reflect the different earning potentials of the land. The rents in Monopoly are related in part to location. Higher earnings accrue to properties located in the yellow, green, and blue color areas. This is analogous to developing country and agrarian factor markets. Land rents and purchase prices are higher in areas with more profitable cropping opportunities, such as new seed varieties or export activities. But only some rural people, usually those with systematically better access to working capital, opt to invest in these lands.

Finally, I assume rationed mortgage credit access. This concept is perhaps the most difficult for students to understand because they often assume that anyone walking into a bank should be able to get a loan. But I emphasize in lecture that sometimes there may be outright discrimination in lending practices, or bank officers are unwilling to lend to poorer borrowers because low repayment rates are assumed (correctly or incorrectly). Thus factor markets are “size-sensitive,” and the poor often get credit at higher interest rates from a secondary market or a moneylender. Actual lending trends in rural India, somewhat parallel to those assigned to players in Table 1, are presented in Table 3.

Chance and skill still partially determine wealth in this Monopoly game. In the original game and in my variation, luck is embodied in the unpredictable roll of the dice. The dice roll determines which properties players land on to pay rents or make or receive other payments. The obvious question about the realism of the dice is usually something like “Why would a poor peasant ever stay at Park Place?” Thus it is necessary to link the stochastic high-rent event to, say, real-life family medical expenses. Alternatively, the bad luck may be another unforeseen expense such as the purchase of chemicals to deal with crop blight. A fortuitous

TABLE 3
Rates of Interest by Land Wealth of Borrower, Rural India, 1985

<table>
<thead>
<tr>
<th>Value of land assets</th>
<th>Konur</th>
<th>Gokilaparam</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>44.9</td>
<td>45.4</td>
</tr>
<tr>
<td>0 &lt; 10,000</td>
<td>27.9</td>
<td>52.2</td>
</tr>
<tr>
<td>10,000 &lt; 50,000</td>
<td>24.5</td>
<td>36.7</td>
</tr>
<tr>
<td>50,000</td>
<td>16.9</td>
<td>24.2</td>
</tr>
</tbody>
</table>


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roll may be seen as winning a lottery or having the good luck of avoiding disastrous events. The poor tax and hospital Community Chest cards directly correlate with these events. By the end of the game, students learn that these temporary income shocks often have permanent wealth implications.

**STUDENT UNDERSTANDING AND ECONOMIC LESSONS**

General lessons from the game are reviewed in a class discussion period following the simulation exercise. From my initial tabulations of the student results, I present a diagram showing how each table performed and the dynamics of wealth across the turns of the game. Students air their feelings about the different property endowments and mortgage credit access, and many state that, of course, “The rich get richer and the poor get poorer.” Students also discuss their playing strategies and which bad luck event cost them money or led to distress sales of property and bankruptcy.

I have played the game across five semesters between 1997 and 1999 at a large public university in the southeastern United States. The student body at the university is young, middle class, and primarily Caucasian, with an approximately equal number of men and women and a handful of minorities. Yet there are many first-generation college students present in each class. The demographic profile of these students may have influenced the outcome, yet these learning experiences are similar to those observed in other settings.7

Results of play during the five semesters were as follows. Students assigned the role of upper players nearly always increased their wealth, whereas those assigned as lower often went bankrupt or saw a loss of wealth. Across all the students in a class, the final Gini coefficients of total wealth have been between 0.52 and 0.59, showing a worsened wealth distribution across the participants (compared with the starting 0.37 statistic).

But interesting exceptions have emerged. Some U players exhibited a degree of altruism (or perhaps a desire to continue the fun of playing) by wanting to make loans to the cash-strapped L players. I have dealt with this by reminding students to think through the consequences of their choices in terms of their success at winning. The L players do not give up easily and have exhibited some cooperative behavior. Similar to the players in Williams’ (1993) simulation, the lower players at a table paired up and merged their meager resources in at least one instance each semester. This tended to even out the wealth distribution at these tables, and in two cases, the middle M player ended up going bankrupt first. In one semester of play, five of the lower-ranked students actually increased their wealth by trading properties to get a monopoly. The final outcome of the middle players toward wealth accumulation or poverty was split fairly evenly. On four occasions, the upper-ranked players lost money as properties were transferred to the middle players.

In the graded essay, I asked the students to describe the plays that occurred at their table and their feelings about the game for evaluation purposes. The students often link the initial property endowments, credit access, and bad luck events (rather than their differential salary levels) to final wealth. But as one student wrote,
Skill also came into play in the game. The skill I am speaking of was in property management and the negotiations that took place between the players. Players had to realize which properties best fit into their portfolios and bid what they could to obtain them during the auction period.

A reading of all these essays shows that the students learned about the reality of developing areas and the dynamics of wealth distribution through the simulation. As one senior commented, “Before playing the game, I did not believe initial endowments had a great impact on the outcome of the game; after playing the game, I realized that they had a large impact.”

Students also noticed how property rents are determined and how poverty made the L players less prone to follow a risky strategy. Many students recognized that the lower-quality property of the poor earned less rent than the property of the rich. They attributed this to the initial property price, the location of the property on the board, and the fact that the poor could rarely afford to make productivity investments (i.e., build houses). One student even identified how a property monopoly imposes higher prices and social costs:

By owning a complete color group you become like the owner of a large estate, thus you can double the rent on all properties. This is one reason why it is better for the “small farmer” if the land is subdivided with separate owners for each section because it is cheaper than paying the monopoly price.

Students who ended up as the L players experienced the greatest empathy for the limited cash flow and inadequate risk management mechanisms of poor people. They recognized how the standard Monopoly strategy of quickly making risky property investments would not be available to the poor because they could not chance being strapped for cash. For instance, one student questioned whether a hotel investment would be wise for a poorer player with land at a lousy location. The U players could take on more risk in buying more hotels and thus received higher returns on average. This means, as one student noted, that players’ marginal rates of substitution and effective land prices varied by their cash flow constraints.

Overall student evaluations of the game have been positive, yet some have questioned its relevance for U.S. settings. Most students held to their earlier belief that all “players” in the United States do get mortgage credit access. Other students felt that property income is not an important source of wealth in the United States, so that “winning” a game would be more related to salaries and human capital endowments. Perhaps more important, the Monopoly board game is often viewed as a zero-sum game in which one player wins at the expense of all others. Whether this characterizes wealth accumulation in any society is a source of contention. But the lessons about how the essential factors of starting property, salary, and credit access affect wealth distribution remain important contributions of the Monopoly game.

EXTENSIONS

I suggest instructors alter the simulation to make it an effective localized learning tool for a variety of classes. Instructors will have to analyze how the class
composition may affect student strategies and playing times. More diverse classes may come up with different tactics, and the context of the game as an exercise should be clear so that students do not feel the new rules are meant to simplify any realities from their own lives.\footnote{10}

My students have suggested extensions of the game, including changing the initial endowments of the players, adding new taxes, and encouraging more player cooperation from the beginning. The game’s analogy of the limited credit access received by poor people was particularly strong, and there are numerous variants of the mortgage lending rules that can be tried. These changes could enhance the learning value of the game by directly linking it to a current event or a setting familiar to students.

Currently the Monopoly game is set within a partial equilibrium of a small economy. The simulation addresses the issues of credit constraints, salary differentials, and property endowments. The relative prices (land rentals, salaries, and interest rates) do not change. Yet this perhaps misses an important component of inequality in which new patterns of wealth distribution constantly shape the equilibrium prices players face. The ultimate long-run pattern of wealth inequality may be reinforced or reduced in comparison to that observed after the one period of Monopoly play.

A growing literature about the dynamics of long-run asset inequality incorporates a general equilibrium framework. On one hand, Alesina and Rodrick (1994) found that initial inequalities may give rise to endogenous tax policies (and changing factor prices), which then increase or decrease economic growth rates. However, their model lacked a dynamic interconnection between wealth distribution and growth. On the other hand, the model developed by Carter and Zimmerman (1999) produced a short-run spike in inequality but modest decreases in land prices as inequality diminished over time. The results are dependent on the model structured by endogenous asset accumulation, imperfect labor and capital markets, and relative price changes consistent with full intertemporal rational expectations.

Thus an even more-advanced variation of Monopoly would consider endogenous prices and institutional change. In the original Starpower game (Williams 1993), leaders are allowed to rewrite the rules of the game after the third round. This would mean one group of players changing the mortgage access and salary levels after a round of Monopoly. Instructors may find it necessary to extend the exercise across two periods in which the rules in the second adjust to reflect the wealth distribution at the end of the first period of play.

Ideas from the literature offer other ways to explore the intertemporal nature of wealth distribution in the Monopoly game. In each case, the instructor might benefit by using a laptop computer in class to simultaneously calculate changing wealth patterns. First, the relative price of capital faced by the different players could be adjusted to reflect the growing amount of money circulating in the board economy. The instructor could estimate the percentage increase in total wealth and reduce the interest rates accordingly. Such a change might serve to equalize wealth distribution over time. Second, the students could vote on an appropriate capital tax structure to be in effect for the next round of play. Voting rights might be proportional to wealth levels at the end of the first round. Alter-
natively, the instructor might follow Alesina and Rodrick (1994) and rely on the tax rate preferred by the median voter. Finally, the relative price of labor could adjust intertemporally. Property asset accumulation represents the primary form of savings available to the players of Monopoly. Yet some models of dynamic inequality (i.e., Galor and Zeira 1993) allow educational investments that pay off in future periods. Students in the Monopoly simulation might be offered the opportunity to save a certain amount each round for education with the assurance that salary levels would be higher in future rounds of play. The students would probably be very interested in discovering whether such sacrifices of present cash flow for future returns indeed lessen long-term inequality.

CONCLUSIONS

Explaining how different rules and endowments affect market outcomes in settings unfamiliar to students is a daunting task for any teacher. Students usually are familiar with popular board games, and these games offer simulated market experiences that may be used in the classroom setting. I have shown how the Monopoly game, a perennial favorite, can be adjusted to incorporate subject matter related to wealth distribution and the dynamics of economic development. Several more general economic principles are embodied in the game, and the simulation can be adjusted to meet the needs of each teaching environment. The simulation is intended to simplify the complex dynamics of wealth distribution and allow students to “walk in the shoes” of poor and wealthy players in a developing area. Although it does not perfectly match a foreign or domestic real estate market, it does highlight aspects of the institutional framework guiding these markets. Extensions of the simulation suggest that students may be able to use the game to explore the long-run dynamics of wealth distribution.

Noncomputerized experimental learning techniques such as this require an upfront investment of the instructor’s time (in game piece set-up and game-sheet printing). The experiment must be accompanied with a fair amount of discussion and reflection. Rule changes must be clarified early on, but the exercise can pay off. Most students have responded that the role-playing has helped to bridge the gap between theory and reality. The next step is to extend this type of simulation to settings from the students’ own backgrounds to help them explore the processes of wealth accumulation in foreign and domestic settings.

APPENDIX A: PRE-EXPERIMENT HANDOUT

This is an experiment in the economics of land market activation, to understand how different initial endowments and the factor market imperfections common in developing countries impact wealth accumulation and income distribution. The instructions are simple; however, if you have questions, please ask.

For this particular experiment there are four types of players with different endowments and factor access rules. This player differentiation is a twist on the original Parker Brother’s Monopoly board game. In the upper left-hand corner of your record sheet you will find a U, M, or L to designate which player you represent; the information includes what salary you earned upon passing Go, what initial properties you own, and your ability to mortgage the property for loans.

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The basic rules of the original Monopoly game are attached. The goal is to acquire as much property as possible so that you may charge other players rent (and avoid paying rent yourself). Players also may buy unallocated properties if they land on the spot. Once all properties of a certain color are acquired by one player, that player has a local monopoly on that section and may construct hotels; these improvements then triple and quadruple the rent. Being charged rents can give a player cash shortfalls; to acquire more ready rent a player must either mortgage property or acquire cash by other means (private land sales or bartering with another player for a “moneylender” loan, say at 10 percent interest per turn). Eventually a player without cash will go bankrupt, at which point the game ends.

To speed up the process, unsold lands will be auctioned off after the first 15 minutes of play. After 45 minutes of play, players will be allowed to swap properties among each other (under bargained terms) in the aim of getting color monopolies. Remember that when a player has all properties of a certain color, the rent doubles on each property and owners of a color group have the right to build houses and hotels there.

Note your play after each role of the dice (where landed, rent paid/received, salary, loans, etc.) on the attached sheet. Remember that your primary objective is to maximize wealth. Part of your exercise grade will be based on how much of a percentage increase in wealth you acquire (compared to other players of your given starting point). The wealthiest player in the class of your grouping will get an extra credit bonus. The other part of your grade will be based on your write-up of the game. In your analysis, comment on (1) the potential of land markets in developing countries to worsen or lessen income distribution problems, (2) the role of unequal property endowments and luck (as well as differences in bargaining skill and creativity) in affecting market opportunity, and (3) the relevance or lack of relevance of the game for understanding land markets and real estate transactions in a setting you are familiar with in the United States (or your home country).

Use actual numbers from your plays and comment on your feelings as a U, M, or L player with the new rules of the game.

APPENDIX B: GAME SHEET
PLAYER TYPE M: EARNINGS AND WEALTH RECORD SHEET

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary = $100 each time you pass Go</td>
<td>Credit Access = Mortgage properties for 10 percent interest rate; interest paid each time it’s your turn.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dice roll, where land</th>
<th>Rent paid/received (cards)</th>
<th>Other payment</th>
<th>Salary collected (loans, property)</th>
<th>Other side transactions</th>
<th>End wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
NOTES

1. The concern about path dependence follows because here the final levels of wealth and income distribution are determined in part by the initial allocation of property rights. This is a standard finding in imperfect market settings in which equity and efficiency outcomes cannot be separated (Bardhan 1989, 5).

2. The main cost of the exercise to the instructor is the purchase of the Monopoly game sets before class. For a class of 40 students, the fixed cost is around $120. However, a nonofficial DOS version of Monopoly can now be downloaded (Anonymous 1998). This computerized version allows up to six players per table and would allow the instructor to change the rules of the game (such as the starting cash, salary for passing Go, and community chest cards). The official CD-ROM version of Monopoly allows for multiple players but no rule changes.

3. Stoddler (1998) has critiqued the use of grades as part of the game payoff to students. The concern of how relative ranking can skew student play is most relevant for games with a public good problem. Because the Monopoly game is essentially a zero-sum game, the strategy alteration may be minimized. I have found that despite the competitiveness instilled by ranking, some cases of cooperation have emerged. Additionally, in evaluations of the game students have complained at my suggestion of penalty points for low rankings but have accepted bonus points for high rankings. Instructors may consider the alternative of offering winners a free meal or some other prize in lieu of extra-credit points.

4. Markets are imperfect because the prices for the related factors of capital and labor are size-sensitive. Thus economic development policy changes toward land market activation have generated controversy as to how property will be transferred between richer and poorer participants in the market (Carter and Mesbah 1993).

5. Including the unsold public lands of the “state,” the initial distribution of land area (property titles) in the new game gives a Gini coefficient of 0.21, and the distribution of total wealth gives a Gini of 0.44.

6. Bhaduri (1973, 15), provides similar data on the pattern of credit disbursement. He finds that
poorer groups rely on moneylenders whereas wealthier groups can acquire low-interest credit more often through cooperatives or government agencies.

7. I am grateful to one anonymous referee who tried the simulation in a class with a very different student composition. This referee observed somewhat similar outcomes, although some students exhibited more charity behavior so that playing times ran longer.

8. As one student stated, “It was not profitable for me to buy property because the only property I could afford yielded very small rents, which meant the only way for me to make money back was if the other players landed on that space about 15 or 20 times, which was highly unlikely.”

9. Although the rich players’ winning the game may appear as a zero-sum transfer across class groups, I found that some of the U group’s wealth increase may be attributed to growth of the game economy. The total money in circulation (the gross domestic product [GDP] of each table) did increase at two-thirds of the tables. This reflected the payout of salaries and the virtual absence of taxation among the players.

10. I appreciate the comments of one anonymous referee in this regard.

REFERENCES


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