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Review

New classical versus neoclassical frameworks: a review of Yang

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Abstract

Yang (2001) summarizes new classical economics, pioneered by Yang (1988). Individuals are consumer-producers; consumption is linked to the level of productive specialization. The key parameter is an "iceberg" transaction cost (i.e., one dollar spent means less than one dollar received). Autarky (specialization) occurs when transactions costs are above (below) a certain threshold. Firms are collections of consumer-producers tied together by contracts. Trade occurs even if individuals have identical preferences and productive capabilities because there are increasing returns to specialization. The division of labor, the extent of the market and economic organization are characterized by aggregating.
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1. Introduction

Economics: *New Classical Versus Neoclassical Frameworks*, written by Xiaokai Yang (2001), is an updated treatise of the path-breaking work he first wrote together with Yew-Kwang Ng entitled *Specialization and Economic Organization* (1993). Building on his dissertation (Yang, 1988), he conveys the same message: neoclassical economics, concerned primarily with resource allocation, has never captured Adam Smith's message about the role of specialization in determining the way economies are organized. New classical economics,

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primarily concerned with economic organization, brings modern mathematical economics closer to its Smithean heritage.

Overall, it would be misleading to characterize this as purely Smithean. After all, Adam Smith was first and foremost a moral philosopher, which is apparent from the subtle cross-references between *The Theory of Moral Sentiments* and *An Inquiry into the Nature and Causes of the Wealth of Nations* (Levy, 1995, or Levy, 2001, chapter 9).[1] Nonetheless, while it does not fully embody its classical predecessor, *Economics* is first and foremost a textbook that will enlighten readers regarding a fascinating new way to think about the science of exchange.

In short, this framework explains the extent of specialization and the way economies are organized using inframarginal analysis of consumer–producers.[2] Modern interest in the economics of specialization began with Rosen (1978, 1983), Becker (1981), and others thereafter, following Stigler's (1976) observation that the division of labor is the key feature of Smith's work that is missing from contemporary analysis. Inframarginal economics means using traditional marginal analysis to determine how much individuals produce and consume within a particular economic structure (i.e., autarky, partial division of labor, and complete division of labor), and then using total cost–benefit analysis to determine which economic structure is ultimately chosen, given certain predetermined parameters. The key parameters typically include the efficiency of transactions, the economies of specialization, and sometimes others, such as the risk of transaction failure. By linking together decisions to consume and produce, it is possible to relate an individual's consumption and well being with his chosen degree of specialization and from there, to characterize the microeconomic structure of economies.

Unlike Yang and Ng (1993), Yang (2001) primarily targets the budding graduate student with many examples, exercises, and review questions. Furthermore, Yang has addressed some of the following shortcomings raised by Smythe (1994, p. 692):

Pure theorists will probably be disappointed by its reliance on specific functional forms. New institutional economists will probably be disappointed by its narrow definition of transaction costs and its crude treatment of institutions. Economic historians and development economists will probably be disappointed by its ahistorical character, especially as it is manifest in its treatment of economic evolution.

Pure theorists will be happier with recent developments, summarized in chapter 13, that establish new classical results using more general preferences and production technologies. While the narrow definition of transactions costs might technically be true, Sachs (2003) notes that "the emphasis on transaction costs puts Yang's models squarely in the context of the modern economic history approaches of North and colleagues" (p. xix). Thus future exchanges between scholars in these fields should be fruitful, especially since they share a common language and some of the same criticisms of standard neoclassical theory. Finally, brief illustrations from economic history are weaved throughout the text to corrob-

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[1] For instance, Smith believed higher economic growth was justified on moral grounds because the consequent rise in wages would lead to improvements in the well being of the children of the masses, at the expense of the masters, whose profits vary inversely with the rate of growth (see Levy, 2001, p. 230).

[2] See Cheng and Yang's (in press) literature review in this issue.

orate various model predictions. While this might not satiate the historians or development economists, it is a major step forward, and here again there will be gains from trade.

The text is versatile and could be used in courses such as introductory graduate microeconomics or applied microeconomics, among others, since the chapters are largely self-contained and can therefore be read in sequence or separately, making it possible to cut out specialized courses from the text. Specially tailored courses are possible because the menu of new classical applications covered in the book includes the microeconomics of specialization, the emergence of firms, the emergence of international trade from domestic trade, economic development, the emergence of cities, labor–leisure choice, population size and specialization, industrialization, the economics of hierarchical and decentralized management systems, transitional economies, economic growth, savings and investment, the emergence of money, and business cycles.

Thus, a course designed around this text would differ significantly from one based on standard microeconomic texts, such as Mas-Colell et al. (1995), Varian (1992), Kreps (1990), or Silberberg (1990), which typically follow this format: section 1—utility/consumers, section 2—production functions/producers, section 3—general equilibrium and welfare, section 4—game theory, section 5—uncertainty, and section 6—social choice, and externalities.[3] This is not meant to take away from these distinct and valuable contributions to neoclassical economics.

However, what is refreshing with *Economics* is that it is written in a way that encourages future discovery instead of leaving the reader thinking that a mastery of the text implies a mastery of economics. This is partly because it is such a new field and partly because the text uses the tools to advance discovery about the science of exchange rather than presenting the tools as if they themselves are the objects to be discovered. Finally, the bibliography, with nearly 700 citations, reflects the enormous volume of classical and modern literature that has been reviewed and synthesized to motivate the models in the text; it will be most useful to graduate students.

Hopefully, readers will not be distracted by the typographical errors, many of which apparently occurred during the changeover between electronic typesetting formats. Changes will almost surely be incorporated in future editions, but for now the list can be accessed from the Inframarginal Economics Society homepage.

2. Chapter summaries and implications

The book is well organized, beginning with an introduction to the standard introductory graduate level treatment of neoclassical microeconomics. Standard consumer theory is summarized in chapter 1, production theory and the neoclassical firm in chapter 2, optimal decision making in chapter 3, and the general equilibrium of firms and consumers in chapter 4.

After a short introductory detour into new classical production theory in chapter 2, the fifth chapter introduces the simplest, two-good new classical model. The choice variables

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[3] In terms of content, Silberberg (1990, pp. 353–357, and p. 493) does stand out from other graduate level micro texts with his attempt to illustrate the classical notion of the invisible hand. However, Silberberg himself notes that it ". . . hardly does justice to Smith's and Ricardo's masterful analyses, . . ." (see p. 355).

are no longer final consumption goods. Instead, individuals choose the proportion of their waking hours to allocate to the production of each good in such a way that the utility of consumption is maximized, subject to a time endowment, a budget constraint, and a production function. Remarkable conclusions, as detailed below, are reached by linking together decisions about consumption and production. Presuming transaction cost conditions are right, ex ante identical individuals will specialize in the production of one good; otherwise there is autarky, and each good is self-produced. In autarky, they self-produce each of two goods, while under the division of labor, they specialize in producing one of the two goods.

Chapter 6 shifts attention from the problem of (individual) resource allocation to (aggregate) economic organization. In short, it focuses on the parameters that determine how this simplistic economy is organized. Individual decisions, defined by parameters and functional forms, can be mapped in the following way:

Tastes, transaction and production conditions, endowments, prices, numbers of different specialists → quantities demanded, supplied, the resources allocation, utility and the configuration of specialization. (p. 162)

The general equilibrium maps in the following way:

Tastes, endowment, production and transaction conditions, and population size → quantities demanded, supplied, relative prices, numbers of specialists, and the structure of division of labor. (p. 162)

Middlemen are introduced in chapter 7. In autarky, there is no demand for the services of middlemen since transaction costs are too high for there to be a rational division of labor that includes middlemen. Only when the transaction cost parameters fall to a certain level will it be feasible for middlemen to emerge. The following hypotheses are presented and explored in this chapter: (1) specialized economic activity rises along with the decline in self-sufficient production, (2) economic activity becomes more varied as the number of traded goods and sectors rises, (3) a single producer's total output share of a traded good rises together with the degree of production concentration, (4) the degree of economic integration rises with the per capita number of trading partners, and (5) the efficiency of exchange and the ratio of transaction services' value (i.e., roundabout production) to consumer goods' value both rise with the division of labor (see p. 181). When middlemen are included, a list of feasible equilibria no longer includes those without middlemen.

The eighth chapter analyzes the institution of the firm. New classical theory moves beyond the neoclassical idea that the firm is simply a production function. By assuming each individual is a consumer–producer, the firm becomes an aggregation of each employee's production function. Firms exist for the same reason that Coase (1937) says they do when he observes that some transactions are internalized within the firm because it is too costly to do so in the market. Firms will not exist if there are only consumption goods, but will exist if there is a division of labor between final and intermediate goods. Thus, the tradeoff is between transaction costs and increasing returns to specialization. In this framework, firms exist when (1) the employer's and employees' residual control rights or authority are asymmetric, (2) only the benefits to the employee are specified, so that the employer receives any revenues that remain after obligations are paid out, and (3) employee labor is transformed into something that is subsequently sold in the market.

Chapter 9 introduces strategic behavior into the mix. When players are not opportunistic, their strategy is chosen independently of the other players' so all transaction costs remain exogenous. When opportunistic behavior is introduced, additional endogenous transaction costs are generated because those participating in the game are now pursuing their interests at the expense of the others. Thus, endogenous transaction costs arise from conflict between players in the game.

Two sorts of endogenous transaction costs result from adverse selection: those due to information asymmetries between players and conflict. Earlier in chapter 4, it is shown that an implicit assumption underlying the existence of adverse selection is that players are assumed to be incapable of taking the other player's observed actions into account. Therefore, by assuming individuals are more sophisticated in how they gather and process information before formulating their strategy, it is reasonable to presume that endogenous transaction costs arise primarily from conflict between players.

The analysis then moves to a simple two-player, two-good dynamic game that compares Nash equilibria under autarky and the division of labor. Here, the new classical generalization shows that endogenous transaction costs generate an inefficient resource allocation and level of the division of labor. The repeated game at the end of the chapter shows that once the effects of reputation are included, endogenous transaction costs (due to competition to capture the gains from the division of labor) fall, and as a result, the network size of the division of labor, and individual productivity increase. This implies that the effects of adverse selection are overstated in the neoclassical framework.

The tenth chapter explores endogenous transaction costs that arise from moral hazard or hidden action, such as shirking, carried out by some agent when hired by a principal to perform some activity. The new classical approach, unlike its neoclassical predecessor, presents a general equilibrium model of moral hazard that emerges only with the division of labor. This implies that, much like adverse selection, moral hazard is overstated in the neoclassical framework because in the real-world, efficient contracts involve trade-offs along many dimensions and not just between risk sharing and incentive provision.

Chapters 11 through 13 are concerned primarily with international trade. Some of the most striking findings in the text appear in these chapters. In his summary of these models, Sachs (2003) writes,

Yang's models underscore the self-defeating, indeed hopeless, course of trade autarky that has enticed, and entrapped, many poor countries over the years. Protectionism is the surest way to destroy the benefits of specialization, and the division of labor, an argument that also goes back to Smith's original conception.

Yang's approach will provide a much sounder basis for empirical understanding, and can address many phenomena that cannot be handled well in the new trade theory, such as specialization at the individual level, the degree of market integration, and the deep microeconomics of network economies such as the use of money as an instrument of trade. (see p. xviii)

The new classical model in chapter 11 shows that international trade can arise from domestic trade, even if individuals are identical, ex ante. Thus without any inherent com-

parative advantages, individuals will still trade if the transaction efficiency parameter is high enough.

In chapter 12, the benefits of free trade are stronger once exogenous (à la Ricardo) and endogenous comparative advantages are simultaneously incorporated. This leads Yang to conclude that neoclassical theory understates the effects of comparative advantage. Furthermore, in the Hecksher-Ohlin model of international trade, countries that have an exogenous comparative advantage in labor (capital) will export labor-intensive goods and import capital-intensive goods. Using models with many goods and people, the new classical theory is more general because without assuming any exogenous comparative advantages, traded goods are those for which the returns to specialization or trading efficiency are greater or those that are more preferred. Therefore, the new classical approach enhances our understanding of trade patterns by generating a richer set of theoretical predictions relative to more traditional theories.

The most general model of trade, presented in chapter 13, predicts that as the division of labor increases, utility levels rise across the board following a shift from an equilibrium in which some individuals are in autarky to an equilibrium in which all individuals trade.

The policy implications differ greatly. For instance, one school of thought suggests that economies should simply be liberalized and everything will fall into place. Standard trade theories also do not make clear the relationship between internal markets and international trade. The new classical approach differs in this regard by demonstrating that the natural progression from autarky within a country to an internal division of labor that eventually leads to international trade occurs if and only if transaction costs decline. Just as in *the Wealth of Nations*, the implications are that without an internal market structure, the benefits of free trade will not be realized. Hence, border price changes are not the only remedy or issue to contend with since domestic market integration is a prerequisite.

Furthermore, chapter 12 presents a bilateral tariff bargaining game that shows that when there is a partial division of labor, the Nash equilibrium involves no tariff negotiations. When there is a complete division of labor, after a decline in transaction costs, the Nash equilibrium involves a tariff negotiation leading to free trade. Accordingly, this Nash-tariff game predicts that developing countries can use tariffs to increase their share of the gains from trade and that tariff negotiations are necessary to neutralize sovereign rent-seeking activities in international trade.

One additional novelty in chapter 11 is the model that shows that the demand for product diversity is more feasible when either transaction efficiency increases or an individual's ability to manage his demand for product diversity improves. The latter might occur if the use of the Internet reduces the cost of acquiring information about products.

The new classical explanation for the emergence of cities is presented in chapter 14. Here urban agglomerations are related to the division of labor, trade and growth. For cities to emerge, all that has to happen is for the extent of specialization, being a function of the efficiency of transactions, to be high enough to allow for the production of non-land intensive manufactured goods. This is due to what are called Type I economies of agglomeration. These are distinguished from Type II economies of agglomeration, which occur because of the network effects of specialization, which in turn require a central location to reduce the society's total travel costs associated with trading. The latter type of returns to agglomeration

is thought to explain the dramatic rise of land costs in cities. Hence, there is an interdependent link between the division of labor, geographic patterns of exchange (i.e., whether centralized or decentralized trade takes place) and the efficiency of exchange. These predictions are complemented by another prediction: as the distance between pairs of trading partners falls, economies of specialization rise at an increasing rate.

Labor–leisure choice is introduced in chapter 15 by relaxing the assumption that individuals use all of their waking hours for productive activities. This makes it possible to tackle issues such as the economic effects of the work ethic. Here the work ethic can be positively or negatively related to productivity, depending on how individuals choose to handle an increased demand for leisure. One solution is to give up consumption variety. The other is to increase consumption variety, which can only be done if individuals become more productive by choosing a greater division of labor, thereby satisfying their increased demand for leisure and variety. Also, nestled in this chapter is a new classical rendition of the "Chicago-School" population-pressure story, proposed by Boserup (1975), in which a sudden increase in population growth puts pressure on the resource base, which in turn leads to innovation through specialization.

Systems reliability theory is used to model the relationship between property rights and coordination failure in chapter 16. The theory shows that the market has two purposes: (1) to facilitate trade, and (2) to maintain pressure on individuals to avoid aggregate coordination failures. Coordination failure, which is distinguished from market failure, occurs only with the division of labor. The most important factors explaining coordination failure are property rights specification and contract enforcement. As specialization increases, there are fewer sellers for each good, which reduces the reliability of transactions in the aggregate. There is a trade-off between exogenous transaction costs, due to the limits of writing complete contracts, and endogenous transaction costs, due to problems of enforcement in the face of hidden information. In fact, perfect competition is inefficient in the new classical framework because there are tradeoffs between the returns to specialization and the benefits of competition.

Chapter 17 builds on the property rights framework by introducing insurance against high transactions costs throughout the economy. In the initial model, there is no moral hazard, and the level of transaction efficiency is exogenously determined. In a world inhabited by risk-averse individuals, complete insurance facilitates the division of labor and thereby raises productivity. The next model explores the effects of moral hazard, associated with individuals' chosen level of effort, on insurance. Complete insurance generates moral hazard if there is complete specialization. Incomplete insurance reduces, but does not eliminate, the costs associated with low effort.

This model allows Yang to make a startling comparison between socialist and capitalist economic systems. The former have complete insurance against medical and unemployment risk, provide savings for retirement, and cover the risk of state-owned enterprise failure. These institutions, in many ways, mimic those found in a capitalist system. However, insurance provision in a centrally planned system comes with much higher endogenous transaction costs, due to moral hazard, than that provided in a decentralized marketplace, despite providing a fair amount of coordination reliability. Thus, the collapse of Gosplan had a devastating effect on the people of the Soviet Union because it brought an end simultaneously to coordination and to complete insurance coverage.

Roundabout production and innovations in machinery through research and development are introduced in the 18th chapter. Yang contrasts the classical view of machinery, which relates it to the extent of the division of labor, with the neoclassical view, which boils it down to R&D investment, irrespective of the extent of the market and specialization. The principle behind this model is that production processes become more feasible as the division of labor is extended. Economies of complementarity are simply another way of saying that a particular production process involves using an economically feasible, greater variety of producer goods. In autarky, economies of complementarity are not feasible because a greater variety of self produced inputs is obtained at the expense of lower consumption, since total factor productivity (TFP) in this trade regime is low. Only following an increase in the division of labor (due to improvements in transaction efficiency), and the resulting increase in TFP, is it possible to observe a greater variety of more productive inputs. That is because each use of inputs generates transaction costs. Firms arise if it is more efficient to hire labor to produce roundabout inputs than to purchase those inputs in the market. By trading off economies of input variety and transaction costs against economies of specialization, the market in this model determines the efficient number of producer goods.

Building on this emerging producer goods framework, chapter 19 elaborates on the relationship between the division of labor and industrialization. Thus, following the horizontal division of labor between food and farm equipment, a vertical division of labor emerges with industrialization in the sense that more elaborate production mechanisms (i.e., a greater number of specialized production inputs) are used to produce farm equipment. According to Yang, what makes this a Smithean model is that Smith thought that the agricultural–industrial productivity gap could be explained by the sector specific benefits of specializing against the sector specific costs of seasonal adjustments. Unlike the industrial sector, the costs of coordination reliability in the agricultural sector outweigh the benefits of specialization. The policy implication is that a decentralized market is what ultimately determines which industrial structure emerges and that it is impossible for a policy maker to know what the efficient structure is.

Chapter 20 summarizes the new classical theory of hierarchies, which come in centralized and decentralized forms. A centralized hierarchy is one in which a decision maker at the top can choose the number of layers within the hierarchy, while a decentralized hierarchy one of Yang's many inventions, is one in which no individual or group can choose the number of layers. The decentralized hierarchy makes it possible to describe four possible economic structures: autarky, partial division of labor with self-provided transaction services, partial division of labor for goods and transaction services "where each middleman has two producers of goods as trade partners, but each producer of goods has only one trade partner," and finally a complete division of labor for all goods and all transactions (p. 499). A distinction is also presented between *one-way* hierarchies, such as a library catalog system, in which the commands go one way, against a network hierarchy, such as a city or a management structure within a company, in which there is communication between the layers.

After surveying the literature on neoclassical and endogenous economic growth theory in chapter 21, a new classical endogenous growth model is derived in chapter 22, in which the driving force is the division of labor. Unlike many models in the class, the model makes no use of scale economies, but relies instead on economies of specialization. It is essen-

tially a dynamic version of the model in chapters 5, 6 and 11, from which the following inferences can be drawn: the transaction services sector income share rises as the division of labor increases, and the effectiveness of transactions determines the rate of growth and the rate at which the division of labor evolves. Interestingly, population and growth are almost independent; almost, because there cannot be more professions than people, and therefore population size constrains the extent of the division of labor (and hence growth). The model can also be used to make pairwise inferences about convergence between countries. This microeconomic growth model illustrates Walt Rostow's (1960) stages of development argument, whereby economic growth rates first fall, then rise, then fall again. Here, both divergence and convergence can happen, depending on each country's stage of development.

The growth model in this chapter is unable to show the beneficial effects that firms have on the evolution in the number of producer goods. Therefore, picking up where chapter 18 left off, chapter 23 presents a two-period growth model that explores the tradeoffs between economies of input variety, economies of learning by doing due to specialization, and transaction efficiency. Education and research can be included in the list of inputs that emerge from this model. In the most interesting economic structure (autarky in period 1, division of labor in period 2), it pays to switch from subsistence to specialization at a later date because the costs of switching are high, people prefer present over future consumption, and because of learning by doing from specialization. Here again, firms emerge if the transaction costs of purchasing inputs directly from the market exceed the costs of hiring labor to produce the inputs in-house.

Up to this point, the book presumes that individuals automatically see the efficient division of labor. The model in chapter 24 describes how a society, through experimentation, searches to acquire information about which economic structure (i.e., autarky and division of labor) will generate the highest per capita real income. To do this, Yang invents a bounded rationality sequential equilibrium model. This is ingenious because it apparently resolves the recursive paradox (see the regress issue, Conlisk, 1996, pp. 686–688), which holds that no bounded rationality model can be closed. To make it tractable, each person, who initially begins with no information about society's economic organization, learns by interacting directly with the Walrasian regime, not with other individuals. The model predicts that mistakes during the search process are not only unavoidable, but necessary to distinguish more effective from less effective economic structures. In this context, the unavoidability of mistakes renders Pareto efficiency essentially meaningless. It also suggests that no one should overstate a firm's success, which can largely be attributed to luck, nor should they understate the importance of bankruptcy in providing information to society about what does and does not work in a specialized economy.

Saving in the new classical model of chapter 25 also emerges from the division of labor. In this simple framework there are only two goods, a crop and a tractor. Just as new classical theory links together consumption and production decisions, saving and investment are also linked in one process, as forgone food consumption is then diverted through investment to tractor producers in the first period. In sum, farmers lend food to tractor producers in period one, and receive tractors as repayment in period two, generating greater crop yields. As in earlier chapters, in equilibrium, people choose their activities such that the utility/real-income stream is equalized between the two occupations.

Chapter 26 tackles the emergence of money. The inframarginal approach highlights the relationship between the division of labor and the emergence of money. It has yet to say anything about the emergence and evolution of banking, and since that is a most important issue in market economies and the transition leading to them, there is an important opportunity here for more research. However, it has the potential to generate much richer ideas about monetary institutions, since Keynes, the Keynesians and the neoclassicals are primarily concerned about how a central bank can optimally allocate the supply of money. In this regard, the model of this chapter is complementary to Menger's (1892) theory of the emergence of money. It will be interesting to see what other insights inframarginal economics provides on money, banking, financial markets and economic organization.

The final chapter details the new classical approach to business cycles. This approach is unique in that business cycles, an efficient and natural result of a complete division of labor, occur without any need for exogenous stochastic processes to explain the volatility, as in many modern treatments of such phenomena. Unemployment is essentially down-time from producing durables. The basic logic behind the two-period model is as follows. There are farmers and tractor producers. In autarky, everyone produces both goods. Under partial specialization, some farmers produce only food, while the rest allocate their time between tractor production in the first period and food production in the second period, and thus they are never unemployed. The pure farmers make first period loans of food in exchange for a claim to tractors at the end of the period. Unemployment occurs only under the complete division of labor. In this case, farmers again lend food to tractor producers in period one in exchange for farm vehicles at the end of the period. In period two, the farmers use the tractors, while the tractor producers remain unemployed, although their output is sold for a price that ensures that they satisfy their two-period consumption stream, such that real-income between the two sectors are equalized. Thus, business cycles can be endogenized, just as so many other phenomena throughout the book.

3. Conclusion

There should one day be a Nobel Prize awarded for work in inframarginal economics, for it has pushed the boundaries of economics' future while drawing inspiration from economics' past. As Sachs (2003) writes, "Yang is one of the world's most penetrating and exacting economic theorists, and one of the most creative minds in the economics profession" (p. xvii). Likewise, this monumental treatise is penetrating, exacting, and creative.

Acknowledgement

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