Dogville or an Illustration of Some Properties of General Equilibrium

HEIKE HARMGART AND STEFFEN HUCK

The analysis of simple exchange and production economies and the first and second welfare theorems are central to microeconomics. The first shows that every competitive equilibrium allocation, created through market forces alone, is efficient. The second shows how every efficient allocation can be achieved through simple redistribution of endowments letting markets do the rest. While mathematically beautiful these theorems can seem a tad dry and abstract to the student. How can they be brought to life?

The good news is that you don't even have to spend your own creative juices on the task. Somebody has already done it. Shot the movie. In color. And, yes, it's out on DVD.

It is "Dogville" by Lars von Trier.

A movie that tries to fill an abstract idealistic concept with real life faces a tremendous challenge. It must strip away many important elements of our lives (in the case of a pure market economy human compassions as much as constitutional rights) and yet maintain enough realism that the audience can still 'identify' with the movie's protagonists. Like most economic models, "Dogville" is stripped nearly bare. The set is pure minimalism, with much of the scenery being merely white labelled drawings on a stage floor.

"Dogville" tells the story of a small village economy with a little over a dozen agents. Life is simple and fairly static until one day a new agent arrives. Poor Grace, her only endowment is her body and the few pieces of clothing that she is wearing (including a rather grand feather boa, an item that, sadly, is of little use in Dogville). Grace needs food and shelter and the villagers can supply these goods. But, of course—and this is the moment when the film reveals its purpose: to examine the logic of pure markets—shelter and food come at a price. And so Tom, the village philosopher, suggests to Grace that she should consider 'physical labor'. Grace knows she has no alternative and, with a smiling face, offers herself to the market.

The movie continues by showing the new equilibrium allocation. Grace helps in the small village shop, provides company to lonely, blind Jack, looks after the children of Chuck, does some gardening and so forth. In return she receives a home and food and even some money

Heike Harmgart is an economist at the European Bank for Reconstruction and Development and Steffen Huck is Professor of Economics and Head of the Department at University College London.

that she spends on the only luxury items available in town, some small figurines sold in the shop. Everyone is better off and, celebrating Pareto efficiency, von Trier summarizes the prevailing mood in one of his chapter titles: "happy times in 'Dogville.'" The economy has grown from immigration and the invisible hand has led it onto the new contract curve.

Of course, once we have established Walrasian equilibrium and proven its desirable properties in the classroom the natural next step is to do some comparative statics. Quite remarkably, this is precisely what von Trier does next. He introduces a small exogenous shock that changes relative prices and proceeds by showing how the equilibrium allocation and, crucially, agents' lives change in response.

Earlier in the movie the police dropped by in Dogville, putting up a poster with Grace's picture and the word "missing." Nothing changed in response to that—after all the villagers knew from the start that Grace must have fled from somewhere. The poster does not provide new information and, accordingly, does not affect the equilibrium.

The turning point occurs when the police come again with a new poster, almost identical to the first, but with the word "missing" replaced by the word "wanted." Grace, the poster explains, is suspected of having been involved in a bank robbery a week ago. The villagers know that Grace is innocent since she has spent all of last week in Dogville; she simply can't be guilty, she has a perfect alibi. Still, this development means that Grace's demand for shelter increases. Her alibi rests on the villagers willingness to provide it. On her own, she cannot prove her innocence and if the village community withdraws its protection she will be in worse trouble than before.

This shock could be modelled in a number of ways. In a standard Arrow-Debreu economy, Grace's endowment of claims contingent on the police coming back for her could be reduced or, alternatively, one could examine a change in her preference parameters with increasing weight on shelter. In a Rubinstein-Wolinsky model with sequential bilateral bargaining, the shock would affect Grace's commonly known outside option. However, irrespective of the modelling details, the theoretical consequences of the exogenous shock are straightforward and unequivocal. For the same amount of labor, Grace will, in the new equilibrium, receive fewer goods in return. Or, for the same amount of food and shelter she must now work harder. In a well-behaved economy with normal goods, we can confidently predict that she will supply more labor and still receive less in return. There is an income and a substitution effect.

Such comparative statics are the bread and butter of economics. But the concept is hard to grasp for non-economists. Moreover, non-economists' have a variety of moralistic hang-ups regarding commodification that can get in the way of a deep understanding of trade. Alas, economies do not shy away from commodifying just about everything when resources are scarce and wholesome endowments insufficient.

Not only must the film illustrate a way of reasoning abhorrent and unfamiliar to non-economists, it must also tell a story that is not pretty. Consequently, von Trier slows down the action and spends much more time on showing the comparative statics than he took for showing the properties of the initial equilibrium.

To begin, Grace's wages are cut. But this is not all the Walrasian auctioneer has in store for her. In the new equilibrium allocation, it turns out, Grace must also supply a new set of physical services. Food and shelter now require the provision of sexual services. This is not pleasant to watch. Some might be tempted to judge the sexual encounters that now take place as rape. But not everybody agrees. As Ben, who is the first to receive his allocation of sex with Grace, explains: "It's not personal. I just... have to take due payment, that's all."

In exploring this new exchange pattern in much detail, the movie raises some deep questions about how voluntary trade is in the Dogville economy. As such the movie's investigation mirrors any analysis of equilibrium allocations that offer what might be conceived as harsh deals to the poor. In "Dogville," Grace's poverty is extreme. She is the only agent in the Dogville economy who has nothing but her body. So, does she have a choice? Dissenters might argue that, when Ben takes his payment, the movie leaves the realm of pure economics and voluntary exchange. Others might side with Ben's view that sex is simply the service Garce has to provide in the new equilibrium—that Grace is not a "victim" of force but merely a price taker. To what extent the new relative prices are manipulated through collusive behaviour of the villagers (who every so often hold meetings in the village church) is an interesting question to be discussed.

In our view, a (classroom) debate about whether or not what happens between Ben and Grace is pure exchange would be didactically valuable as it mirrors debates about the benefits of global trade where some appear to have more choice than others: What does one think of first-world, toxic-waste dumps put in third-world countries? Or about child labor or prostitution, where it is empirically difficult to distinguish force from exchange. We would hesitate to suggest any particular outcome to which such a (classroom) debate should be steered.

The comparative statics of Dogville follow those of a market where agents have well-behaved preferences. Income and substitution effects are as theory predicts, shown in vivid pictures. It is a striking achievement and one of exquisite rarity in art.

We commend the movie as of prime educational value. That it isn't pretty can't be helped. Surely, every good economics student with a little bit of imagination will suspect that, even in a simple Edgeworth box, life is none too pleasant close to the wrong corner. "Dogville" confirms this suspicion: Life on the contract curve need not be nice—not even in slightly bigger economies with a little bit of production as well. In terms of basic Micro 101, one might say that "Dogville" stresses the importance of the second welfare theorem that sometimes does not receive quite the same attention as the first.

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REFERENCES AND FURTHER READING

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