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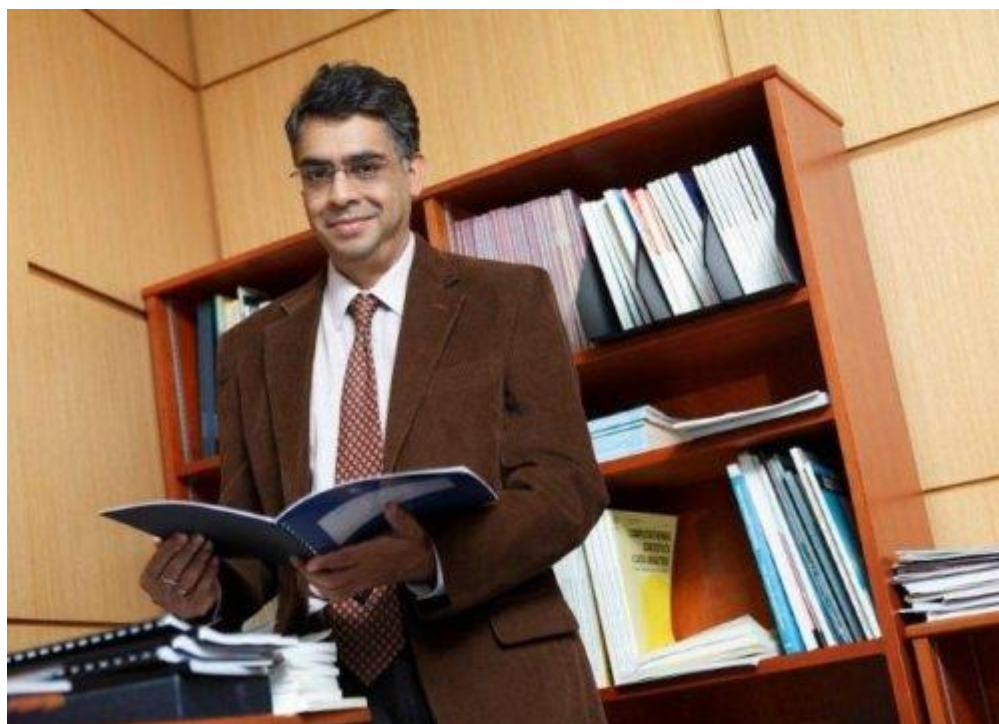
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Headline: Resource Allocation: Is There A Fair Way To Slice Up The Pie?

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SMU Professor of Economics Shurojit Chatterji designs mechanisms that countries can use to allocate their scarce resources more fairly and efficiently.

AsianScientist (Aug. 7, 2014) – By Alan Aw – Education and healthcare are essential public goods typically provided by governments to citizens. For other public services such as the allocation of land and television broadcasting rights, governments hold auctions to allocate the rights between various bidders, rather than provide the services directly. However, finding the right level of public goods provision or figuring out the best way to run an auction is no straightforward task.

Whether public goods are provided directly by the government or through national auctions, one key measure of a socially and politically acceptable system is that it leads to efficient resource allocation. Decision outcomes such as the level of public goods provision should be efficient in the sense that no one individual is made better off without making at least one individual worse off, a condition known as Pareto efficiency. For example, a Pareto efficient healthcare system would be one where resources are allocated in such a way that it is impossible to increase the healthcare benefits of one person without reducing the healthcare benefits of another person.

Professor Shurojit Chatterji from the Singapore Management University School of Economics operates in the field of mechanism design, a subset of economic theory which focuses on how to allocate resources fairly and efficiently.

“Mechanism design theory takes into account the fact that individuals or economic agents will behave strategically with their private information. In my research, I help economic institutions design mechanisms that aggregate the preferences indicated by agents in such a way that optimal outcomes result, in spite of the strategic behaviour of the agents,” he explains.

Discerning true preferences

Social, political and economic decisions are made based on the preferences of individuals. If individuals indicated their true preferences, achieving optimal outcomes would be as straightforward as summing up or aggregating their individual preferences. In reality, however, such preferences may not be known, which can lead to suboptimal outcomes. Furthermore, the desire to obtain the greatest benefit, especially in competitive situations, incentivises individuals to act contrary to their true preferences.

“There are many situations we encounter every day that suggest we should manipulate our choices and act in a deceitful manner. Doing so increases the benefit to the individual, but could in fact lead to substantial losses in overall efficiency,” Professor Chatterji says.

“Therefore, for an economy to achieve efficient allocation of resources, it is necessary to have economic institutions that gather truthful information from auctions or polls to select an optimal outcome. Creating these economic institutions is where mechanism design comes into play.”

In mechanism design, researchers investigate methods that can elicit true preferences from individuals or economic agents. For instance, in the telecommunications industry where companies bid for rights to transmit across different channels to avoid communications interference, auctions are specially designed to include mechanisms that resist efforts by the participants to manipulate their true valuations.

What makes a good mechanism?

To find robust mechanisms that resist manipulative behaviour, Professor Chatterji applies two specific methods: randomisation and restricting preferences.

“The literature consists of many impossibility results, which suggest that it is impossible to have truthful revelation of information without running into a dictatorial scheme. This means that in a perfectly honest setting, there is one participant whose preferences will always directly determine the outcome. That is inequitable and socially undesirable,” he notes.

“However, I try to show that if we either randomise the procedure or restrict certain options of economic agents, then we can move away from dictatorial schemes.”

Apart from fitting randomisations or preference restrictions into mechanisms, Professor Chatterji also studies ways to make mechanisms implementable in real life situations.

“It is one thing for a mechanism to resist manipulation and be ‘strategy-proof’. But it is a different issue for it to be feasible. An important aspect of a mechanism is how fast it can generate

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outcomes based on inputs by economic agents. This is important especially in economic institutions that rely on computerised solutions derived from designed mechanisms,” he explains.

Having investigated some problems related to the computational complexity, or the rate at which computerised mechanisms generate outcomes, Professor Chatterji is interested in venturing into the algorithmic mechanism design, an area traditionally studied by information and computer scientists rather than economists like himself.

“There are examples of mechanisms that are good, but have not been implemented due to unrealistic computational demands. It is, therefore, important and interesting to look into ways that can reduce these computational demands, and focus attention on computationally feasible mechanisms,” he notes.

Economics and everyday life

While mechanism design may play a central role in attaining efficient resource allocation, for Professor Chatterji its influence reaches far beyond economics.

“Even for non-experts, being aware of the role of mechanism design in establishing economic institutions will provide insights into good decision-making. Indeed, I think mechanism design beautifully demonstrates the centrality of economics in our daily lives,” he quips.

“Resource allocation affects not just governments and economists, but all of us. There are times when we argue with friends or family over resource sharing or the division of a shared good. It turns out that the principles behind mechanism design can lead to better procedures that may be welfare-enhancing for all participants.”

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