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The Economic Impacts of Food Waste

Moni Pal

In a segment titled “Food Waste” on HBO’s Last Week Tonight, a sound bite plays: “A report by the National Resources Defense Council says that as much 40 percent of all the food produced in the United States never gets eaten...Americans throw away enough food every year to fill 730 football stadiums.” Images of countless boxes of perfectly good vegetables being thrown away and entire orchards littered with completely edible but unsellable fruit are shown.

A New York Times article estimates that one third of all the food produced in the

world is wasted, costing the global economy \$400 billion. Food wastage is also a wastage of the water, energy, labor, and other resources required to procure, package, and transport the goods. Yet, 870 million people in the world do not get adequate food. According to the Food and Agriculture Organization of the United Nations, “The food discarded by retailers and consumers in the most developed countries would be more than enough” to feed the world’s 870 million hungry people.

With the world population growing rapidly, food and agriculture industries must

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Book Review: ‘How Asia Works’

Bryan Cikatz

If you were to compare the modern cities of Tokyo, Seoul, or Beijing with their counterparts of sixty years ago, you would be looking at two entirely different worlds. The towering skyscrapers, sleek transportation, and modern amenities are all products of East Asia’s rapid economic growth. Coupled with America’s “Pivot to Asia” and China’s influence in driving global growth, it is apparent that Asia is taking center stage for the 21st century. In his book *How Asia Works*, Joe Studwell examines the history of East Asia after the Second World War and answers some of the most critical questions surrounding the region’s ascendancy: How did these economies manage to grow so much in

such a short amount of time, why were some countries more successful than others, and is China’s model of growth really unique?

Despite the complexity of modern institutions and variety of policy choices, Studwell argues that the most successful Asian countries adhered to three relatively simple guidelines: land reform in favor of the peasant/farmer class, an export-oriented manufacturing policy, and restrictions of the financial sector tying them to the nascent industry. Land reform was a critical first step in establishing a strong base for society as it allowed for reliable exports (in the form of surplus agricultural products) and created greater wealth in the lower classes thus strengthening the domestic market for

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Economics Advising Office’s blog : <http://uwecon.wordpress.com>

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the new industries. An export-oriented manufacturing policy was instrumental in creating large, competitive firms like Honda, Toyota, and Samsung. This policy often took the form of export subsidies. These subsidies gave the firms assistance until economies of scale came into play while forcing the company to develop a top-notch product as it was required to compete on the international market. The restriction of the financial sector not only prevented capital from flowing out of the country, but it allowed policymakers to direct that capital towards the exporting firms. Without these restrictions, banks would have incentives to invest in less productive sectors of the economy such as real estate.

Studwell logically argues that the countries which did not grow as fast simply did not adhere to his policy prescription. Studwell divides the region in two groups: the “success stories” (Japan, South Korea, Taiwan, and China) and those that failed to implement his recommended policies (Indonesia, Malaysia, Thailand, the Philippines, and Vietnam). Furthermore, he notes that at the end of the Second World War, these countries had roughly similar demographics (regarding percentage of the population in the workforce), levels of GDP per capita, and literacy in an attempt to show that no country had a significant head-start over the others. In the case of land reform, the Philippines were the most extreme example of the failure to diminish the power of the landed elites. In order to show the effects of effective land reform, Studwell reveals that in the 1980’s Filipino agriculture produced 655 USD per hectare while Japan produced 10,000 USD per hectare. Regarding manufacturing policy, Studwell examines the automobile industry in Malaysia. Unlike South Korea and Japan, Malaysia failed to properly incentivize its entrepreneurs and regulate the behavior of its firms. The effect of this is apparent today: despite its many attempts, Malaysia does not have a successful, native-born car manufacturer. Finally, the effectiveness of financial restrictions can most easily be shown in the context of the

Thailand’s collapse during the 1997 Asian Financial Crisis. Thailand’s problems mostly stemmed from heavy investment in high-end real estate – an unproductive sector that attracted vital funds away from manufacturing industries. If Thailand had greater control over its financial system, the country would have had a stronger economic base and an easier time preventing capital outflows during the crisis. For all three policy options, Studwell successfully shows its effectiveness by comparing the winners and the losers.

In regards to China, Studwell claims that the country’s current development is nothing new – China has merely adopted strategies that have seen success in Japan and South Korea. In fact, even some of the political and social repression of the Chinese state has precedent in these two countries. China has captured the world’s attention simply because it has implemented these policies on an unprecedented scale. The sheer size of the Chinese population means that hundreds of millions of people benefit from economic growth and development. However, Studwell points out that China is at a very difficult stage in its development as some areas need relaxed control while others still require centralized direction. China would greatly benefit by delegating more power to the provinces; a less centralized state would give local party officials more autonomy and resources to effectively deal with local problems. On the other hand, China’s financial system is still in its infancy and needs continued supervision by the state.

To put it simply, I highly recommend this book. It is an engaging read, full of interesting facts interlaced with personal anecdotes so that the reader has a complete image of the world being represented. While I personally wish that the author went into greater depth regarding policy for newly developed countries, Joe Studwell does succeed in providing the keys for understanding a developing economy. Once you’ve turned that final page, you’ve begun to understand how Asia works.

From Stable Marriages to Medical Residencies

David Zeng

Imagine a community of 10 men and 10 women who wish to all be married to a member of the opposite sex. Each member also ranks those of the opposite sex with respect to their personal preferences. Our job is to act as a matchmaker and decide how to pair everyone off according to their preferences. We define a matching of the entire community to be stable if there are no two people of the opposite sex who would prefer to have married each other over their current respective matches. To illustrate this, assume that we matched Alan and Allie together, and Bradley and Beth together. However, it turns out that according to their preferences, Alan would have rather been paired with Beth over Allie, and Beth would have rather been paired with Alan over Bradley. In this situation, our matching did not result in stable marriages. Given this condition, is there a way to pair everybody off so that all marriages are stable?

As it turns out, there does exist at least one matching such that everybody gets paired off, and the marriages are stable, for any equal number of men and women. This was proved by mathematicians and economists David Gale and Lloyd Shapley. The big result is their matching process known as the “Gale-Shapley algorithm.” A key feature of this process is that it requires multiple rounds of tentative matching. In each round, the process is as follows:

1. Each unengaged man proposes to their first choice (so it is not necessarily true that every woman gets a proposal).

2. Every woman who is proposed to is tentatively matched to the man who ranks the highest according to their preferences, and then rejects any other proposals.

Notice that this means that even if a woman accepts a proposal in one round, she might receive a proposal from a man she prefers more in some subsequent round. In this case, she would then reject her current match to accept the new proposal. The reader may verify that if we repeat this process sufficiently many times, all members will be engaged and the engagements will be stable.

While this an interesting problem in and of itself, researchers have played around with the

conditions of the problem and added constraints to model real world situations and then come up with solutions. One very notable example involves the process of matching medical students to their first hospital in completing their residencies.

Historically, the majority of fraternities were comprised of college seniors. As these fraternities were essentially competing against each other to recruit their top candidates, some began to extend offers earlier to students earlier than the others. Over time, fraternities kept “rushing” ahead of each other to recruit students. From an economist’s point of view, we can see fraternities and prospective students function similar to that of a labor market comprised of employers and workers. The process of fraternities recruiting members earlier and earlier is an example how a market unravels, resulting in market failure.

In the US, graduated medical students must continue their training at a hospital for a period of time, a process commonly referred to as completing a “residency.” In this context, we can view students and hospitals as components of a market prone to unraveling. Indeed, the comparatively low supply of students encouraged hospitals to extend offers of residencies earlier and earlier (sometimes before students even decided on which branch of medicine to focus on!). In addition to this, students had an incentive to delay their decisions by essentially “holding out” on an offer in hopes of a better one from a different hospital. As a result, National Resident Matching Program was established in 1952 as an organization that would act as a matchmaker and pair students and hospitals, using essentially the Gale-Shapley algorithm.

Recognizing and studying these general sorts of markets and how rules could be implemented to prevent unraveling or market failure lie in the economic field of market design, which remains as a heavily studied topic today. Starting from the model of the stable marriage problem, economists have been able to model markets today and come up with significant improvements and insights on problems such as matching students to public schools, improving the way kidneys are exchanged across many donors and recipients, or how ad spaces on websites are auctioned out to companies.

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increase supply to meet the rising market demand, but they should try to be efficient. Otherwise, the amount of food waste will grow along with the population. One popular suggestion is to make cold storage and transportation available to developing countries, where crops and meat perish quickly due to lack of refrigeration equipment. However, this suggestion is heavily dependent on other clean technologies: renewable energy, energy storage, and energy efficiency. Most of these countries have poor cold storage facilities because access to electricity is either limited, unavailable, or too expensive.

In addition to changing the structure of harvesting and distributing food, there also must be changes to policy and public opinion that try to control food waste. Grocery stores are forced to overstock so that customers find it pleasing to look at. A typical customer will buy a bunch of broccoli if it is displayed with several other bunches. However, if there is a lone unit of on the shelf, the customer will not buy it, even though it may be perfectly fresh and edible. Similarly, when fruit is picked in orchards, it must be ranked based on its “beauty,” according to USDA standards. A “number 1,” peach would make it to the grocery store, but a “number 2” peach would probably be thrown away because the grade automatically causes the item of fruit to lose a significant amount of its market value. When this happens, the farmers may decide to throw the peach away rather than incur a loss, because the cost of transporting the ugly fruit will be more than the selling price.

The good news is, public opinion has already started to change for the better. For example, a food service organization named Bon Appetit Management Co., an \$800 million company, is purposely trying

to use the cosmetically unappealing fruits and vegetables when making their meals that they distribute to cafes nationwide through a program called “Imperfectly Delicious Produce.” Claire Cummings, a waste specialist, said that she was inspired to create the IDP program after seeing all the waste on farms. IDP benefits the environment as well as farmers, who see it as an economic benefit, because earn at least some money by selling produce to Bon Appetit, rather than making zero profit when it is thrown in a landfill. Another large facet of encouraging sustainability efforts in this area relates to food scrap recycling. Recycling food waste saves space and reduces methane emissions from landfills. When food scraps are deposited in landfills, the food scraps rot in anaerobic conditions and produce greenhouse gases. In places like Seattle, composting is quite normal and is slowly becoming more and more popular in other parts of the US. However, a 2010 EPA report found that less than 3 percent of food waste in the US was recycled. Recycling food sounds good in theory, but a big problem emerges when one considers the economic cost of doing so. It takes money and labor to separately collect organic materials, separate organic materials from “mixed” garbage, and run the recycling facilities.

At this point, the technology is there to at least reduce some of the food waste being directed to landfills. However, in the future, there may be smarter ways to finance these operations so that they are not so capital intensive. Together with policy changes that mandate food conservation and recycling food waste, the atmosphere of the food and agriculture industries of America can be transformed for the better.

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