Intermediary Information Machine (IIM) Model of Economics

By

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Summary:

The dogma that free markets are the only solution to economic progress has been proven time and time again to be a farse. As I write this, the US is witnessing its biggest economic shutdown in modern history, yet the markets are down less than 3% since the shutdown began. The economic models that these markets are built on, which assume "rational actors" and "scarce resources" are clearly outdated and obsolete. We need to reassess the way we view economic activity at a very ***fundamental*** level if we hope to rid ourselves of all the extreme defaults of free market thinking – without reverting to failed models such as communism and socialism. In this paper, I will attempt to convince the reader that by changing how we fundamentally think about economic activity, we can continue to reap all the benefits of free markets and unlock new methods of resource allocation that will complement and hedge against irrational exuberance.

The following is my proposed model of economics based on viewing humans as decision nodes and not rational actors. The potential benefits of making this *fundamental* change are as follows:

- Finally solving the age-old issue of "the problem of the commons"
- Empowering policy makers with the tools necessarily to more adequately allocate societal resources
- Putting prices on societal goods that the market cannot, such as stay-at-home mothers and public parks
- **Most importantly: allowing measurable economic activity to continue even in times of quarantine**

While all the ideas discussed in this model have most likely been presented in academic circles before, the high degree of complexity by which they are presented in academia have made these ideas unpractical. The main value add of this model is that it (A) does not shy away from digging into the very basics of the current consensus on economic thought (B) is presented in a manner that is simple and elegant enough for policy makers on all levels to grasp and design implementable policies based on this model.

Introduction & Mission Statement

This model is an effort to show that if we want to build a 21st century economy, we need to stop using the basic economic models that were developed almost 80 years ago and adopt ones that more accurately describe economic behavior. To do this, we need to replace the assumption that humans are "rational actors" with a more modern view that humans are "decision nodes". Why is this important? Because this **underlying assumption has a very complex domino effect on how all economic policies are designed.** One very basic example is that under the assumption of "rational actors", we cannot model the fact that most people would rather get 100 dollars of dividends from Tesla stock, than get 110 dollars of dividends from tabaco stock. This observable human behavior cannot be modeled properly if we continue to use the basic economic model that is taught in every economics 101 class.

The mission statement of this model is not as an detailed model for understanding all economic activity, but rather as a different lens by which we can view basic human activity in the economic world, and then eventually build new and innovative policies on them not tied to traditional dogma that relies on neoclassical models that place "free markets" at their center point. The main element of this model is viewing markets as just one form of how collective decision nodes in the economy work. By accepting that markets are flawed we can come up with new "markets" that do not rely on buying or selling. These Intermediary Information Machines (IIMs) can better measure societal goods and thus allow policy makers to better manage how resources (budgets) are allocated. If, for example, what society really wants is 3x more investments in public parks, or 2.42x investments in public healthcare, the manner by which policy makers must get to this information now is through proxies that rely heavily on traditional IIMs (markets). **What would a perfect IIM for healthcare be? I do not know.** What I hope is once we start thinking in terms of IIMs and not "markets", that someone can come up with an IIM that perfectly measures the resources that are needed to fill society's real need for healthcare and overall societal resources become efficiently allocated. I hope this model will be the economic version of an iPhone: something that others can utilize to come up with amazing ideas such as Uber and Twitter.

Deficiencies with Current Economics

A house is only as sound as the foundation it is built on, and the foundation of the current economic consensus is over 100 years old and beginning to crumble. In essence there are two main problems with modern economics **(1) that it can only *effectively* measure economic activity that goes through a market** – building a public park has economic value to society but isn't efficiently measured by markets – and **(2) all new economic ideas and models are consistently built upon the same Rational Actors Model that was developed in the first half of the 20th century.**

With regards to the first problem: let's assume Government A uses public funds efficiently and builds a fantastic public park that everyone in society enjoys. This act has absolutely no direct impact on macro-level KPIs (yes, indirectly it is imbedded through other the contractor's revenue but that that degree of separation makes dilutes how much actual value was created). Meanwhile, Country B simply sells a piece of land to a private equity firm that builds a number of large

mansions on the land. Which country created more economic value to society? Obviously country A. However, because current economics only *effectively* measures output that is done in a market setting, the action of country B, in most economic theory, will be seen as the better of the two. What cannot be effectively measured cannot be effectively incentivized. In essence, if you can only effectively measure market activity, that means you really only incentives actions that benefit actors in the market with the most purchasing power, thus leading to more inequality and the worsening of economic activity for society as a whole. **Current economic models implicitly incentives governments to act in a manner that is detrimental to overall economic output (market economic output < total economic output)**. However, if we could find a model that can be used to effectively measure the economic output of building a public park vs building mansions, government can make better informed decisions on policy. It may very well be that it is better to sell the land to a private developer, but with today's models that focus on market activity, policy makers are working in the dark. To do this, we need to change the very fundamentals of economic thought regarding what is or isn't considered "economic activity". We need a fundamental model that allows us to efficiently price public goods to make informed public policy decisions.

The second aforementioned problem in my opinion is the main impediment to actual economic innovation: insistence on building upon tired old models instead of revolutionizing the very basics of economic thought. When Romer first came up with the notion that ideas (i.e. information) is the real driver of economic growth, he decided to model this on the same models that were developed in the 1930s instead of coming up with an entirely original model to explain his fundamental idea. Over the past two decades, we've seen time and time again behavior economists destroy the assumption that humans behave in accordance with the set of actions we have labeled "rationality". Yet despite all of this, anyone coming into economics is still taught the Cobbs-Douglas model of economics as if it was holy scripture and not a model made at a time when the way economies functioned (manufacturing based) were fundamentally different to how economies function today. **Over the past 100 years world economies have drastically changed, yet the models we use to describe these economies have remained the same.** So, the obvious solution is to try to build a new fundamental model that does not need an assumption of rationality to work in all cases. How can this be done? By simply viewing humans as decision nodes instead of rational actors. This does not negate the previous economic models, as rational actors are in fact just decision nodes that behave in accordance with a prescribed set of actions that we label as rationality. Thus, by making this change, we can still use all the tried and tested models we have today, and come up with new models to build upon. We need to integrate "irrationality" into our fundamental models, and IIM is the way to do it.

Explaining the IIM Model

Attached with this white paper is a PPT that explains the model visually. In this section I will attempt to explain the thought process behind the model itself. In essence the model has three main elements that I will try to explain one by one: **1- Humans as Decision Nodes | 2- Institutions as Collective Decision Nodes (CDNs) | Markets as Intermediary Information Machines (IIMs)**

If we want to think about economics on a fundamental level, we must first think about what it means to be human (economically). I would argue that the first true economic activity was when humans became hunter-gatherers. When humans first decided to exercise the concept of "division of labor", economic activity began. What was the change that made this happen? In my view, the essence of what gave rise to economic activity was when humans gained the ability to take sensory inputs and output an economic decision on who would become a hunter and who would be a gatherer. **Thus, the essence of homos-economicus was his/her ability to make a decision regarding how resources should be gathered**, or in more modern words: the economic essence of human beings is the ability to make decisions regarding resource allocation. However, economics, like temperature, is a phenomenon that only occurs in large numbers. So once humans gained the ability to transfer economic information to other humans, each single human became a decision node. Here we define decision node as: an entity that can take in information regarding resources and output a decision regarding resources. An important element of this is there is no prescribed set of outputs. An economic decision is an economic decision, regardless of whether it is "rational" or not.

Once humans moved on from hunter-gathers, they built tribes, which are in essences just a collection of multiple decision nodes where some of those nodes had more decision-making power than others. In other words, **all institutions are in effect just collective decisions nodes (CDNs)** where there is at least one prime decision node (so a single person can be a CDN in of themselves). The first real CDNs were tribes, where prime decision nodes were based on age seniority. This eventually evolved into decision nodes that were exclusively created for a single set purpose: the first being armies. The evolution from there on to CDNs made for a single economic purpose (corporations) is one that has been studied extensively – just not in this specific terminology.

The most important part of this model, and the element by which it is named are Intermediary Information Machines. As is clear to anyone, economic activity existed long before markets when humans were making decisions on who should hunt and who should gather. However, it was **only when these decisions were done in the context of buying and selling using currency was this economic activity able to be measured effectively**. Before the invention of markets, each CDN just communicated directly with other CDNs on economic decisions (i.e. bartering). Once markets were invented, it became easier to communicate regarding mass economic decisions. What the market was is a machine that inputs its participants preferences and outputs a single number (price) by which participants can make informed decisions on whether to buy or sell. This simple input-output machine revolutionized how economic activity was conducted, as it made the processing of information regarding resource allocation much more efficient and effective.

In this model, all "economic activity" is the communication between CDNs on how to allocate resources, and markets (an IIM) is a simple machine that made this communication easier to process. **Once this information was easier to process, it became easier to measure. What can be effectively and efficiently measured can be effectively and efficiently managed**, and with the evolution of markets, this led to greater economic growth. Thus, information regarding resource allocation is the basis of all economic activity and enhancing its processing enhances economic growth. Moving forward we have two ways to truly enhance economic growth: augment

existing IIMs through technology/regulation or find all new IIMs that do not rely on buying or selling (non-binary IIMs).

How the Model is Novel

Much of the ideas discussed in this model are not entirely new. The impact of information (either in the form of communication, ideas, or know-how) has been discussed in academic circles for decades. The value add of this model is three-fold:

First, it makes the primary driver of economic growth as information, not capital or labor. This moves the goal-post in terms of how countries view their path towards economic growth. Instead of trying to accumulate capital or labor from abroad as the *primary* method for economic growth, **countries will instead aim at enhancing how economic decision making is done within its country**. This means that the focus of growth will be enhancing the method by which resources are allocated in a more efficient and effective manner, instead of simple trying to grow the total amount of resources. This has already happened without this model before: countries that have become rich despite little in terms of resources or labor, but due how information (decisions) flowed in their economy. According to this theory, if Country A's policy is to attract foreign capital, while Country B's policy is to enhance how decisions regarding current capital are made, Country B will outperform Country A.

Second, this model greatly deemphasizes the role buy/sell markets have in the allocation of resources. In all other economic models, the fundamental method by which resources are distributed is a system built on the binary of "Buy and Sell". Meaning that information on preferences is only processed if it is in the form of a buy or sell order. This model thus allows for the inclusion of non-binary markets: input-output machines that can process economic information without the need of buying or selling. The invention of new markets is not novel to this model, futures markets are an augmented IIM where the buying and selling is done on the basis of hedging. **However, this model suggests the for true economic growth, we need to develop novel IIMs.** One example of a non-binary IIM would be the following: giving 10 people each 100 fake dollars and asking them to allocate those dollars among 5 items and then processing that information on how actual dollars should be allocated. This market has no buying or selling, yet it processed information on how resources should be allocated based on the preferences of a number of CDNs.

Third, this model focuses heavily on pricing and effectively allocating resources related to externalities. The problem of the commons is not that common goods will be abused; it is that **there is no way to efficiently manage resources related to the common good because there is no pricing mechanism**. As we speak, there is a negative externality of me leaving my house and getting infected. There is some value (X) to society for me staying in my home. I, and everyone who is staying home to reduce the risk of overcrowding medical resources, should be fairly compensated for this externality, however, current economic models were not built on a fundamental level to deal with these

sorts of questions, as there is no completely rational market for this sort of externality (if the value to going out to me is Y, it would be irrational of me to stay home if my compensation is lower than Y, and in most cases Y > > X).

Potential Applications

I am hesitant to discuss the applications of this model, as I wholeheartedly believe the best and most useful applications will come about when enough experienced policy makers buy-in to the theoretical framework that deemphasizes pricing private goods and emphasizes pricing public goods. However, **just as a means to explain what the applications could look like** I have come up with the following 3 potential applications of the model to give the reader a better sense of the logic I am proposing.

We are currently living in extremely radical times so any solution worthwhile will be radical.

Augmenting Current IIMs

All current IIMs are binary: they are based on information being sent in the form of buy/sell orders. Therefore, an augmented IIM is any traditional market that tries to incorporate pricing externalities.

Quarantine Pricing

Let us assume that the value to society of someone staying at home is a function F and its only variable is the number of people currently quarantined (x). F(x) is a decreasing function, meaning as the number of people quarantining increases, the marginal value of the someone quarantining decreases, and the opposite is true. I propose the following pricing scheme to compensate people for the true value of them staying at home: the state issues tickets for people to be able to leave their home whenever they desire (effectively allowing them to bypass the quarantine) and all the proceeds from this tickets are given directly to those who decided not to buy them, thus ensuring that there are no free-riders and that everyone is fairly compensated for their positive externality.

Some simple math to show what this would look like

Assumptions	Scenario A	Senario B	Senario C	Senario D	Senario E
Total Population	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
Precentage of Ticket Holders	5%	10%	15%	20%	25%
Price of Ticket (SAR Per Month)	30,000	25,000	20,000	15,000	10,000
Quarantine Compensation Per Person	1,579	2,778	3,529	3,750	3,333
Total Ticket Revenue	30,000,000,000	50,000,000,000	60,000,000,000	60,000,000,000	50,000,000,000

Creating New IIMs

A new IIM is any "market" where the economic information being processed is given a non-binary form, or in other words markets for assessing preferences that is not built on buy/sell orders.

Algorithmic Fiscal Budgeting

In any state, there exist a set of investments that have the sole purpose of public utility (public parks, stadiums, public hospitals). Each year the government attempts to allocate resources to these based either on intuition on what the public truly desires, or if they want to be sophisticated about it, they use the private markets as proxies for how the public truly values these items vis a vis one another.

What I propose is the following: the budget for each of these items be based on a function F(x,y,z) where x is the total government budget, y is some factor deemed important for consideration by the government, and z be a factor that is determined by a yearly citizen preference exercise in which every citizen logs into their Absher account, is given 100,000 fake riyals and told to allocate these riyals between the different items the government is thinking of investing in.

The input/output of that exercise is the IIM. Society is giving information regarding their different preferences (how much they value a new hospital vs a new public park), and this information can be used in combination with other factors to determine how to efficiently allocate public resources. To be clear, I am not suggesting the exercise input (z) be the direct allocation, just that (z) will give policy makers a much better idea of what are the true preferences of society in that year.

Non-IIM Applications

If you buy into the theoretical explanation for how the economy truly works, as a just a network of decision nodes sending information regarding resource allocation, then there is no inherent reason why private CDNs are more efficient at resource allocation than public CDNs. In my model, there is no assumption that asserts market based CDNs (corporations) are inherently better at resource allocation than public CDNs (bureaucracies). Therefore, macro level KPIs regarding privatization would be drastically altered under these models based on an empirical assessment, not on a dogmatic view that is based on how corporations operate more efficiently in the United States given how intentionally mismanaged their bureaucracies are.

Vision for the Future

This is not a finalized model. The main value-add of this model at this current stage is a conversation anchor on how public policy regarding economics should be in the future. I took extreme efforts to make sure this model is only complex enough that is has descriptive/prescriptive power while at the same time being simple enough for policy makers at all levels to understand and hopefully build good regulation and programs for it regarding resource allocation.