

A GENERAL THEORY OF DECISIONS: PSYCHOLOGICAL ECONOMICS

A Unified Model of Decision-making Under Uncertainty

Part II: Interaction Between Agents

Abstract

This paper is the second of two core articles that together comprise Psychological Economics Theory, a generalized model of decision-making under uncertainty. The first paper, subtitled “Foundations & Individual Choice”, delineated foundations and an overview of the overall theory and established a new framework of individual choice. Conventional single-value lottery outcomes are omitted; agents instead face multi-period matched outcomes that contain personal total benefit (PTB) and personal total cost (PTC). They optimize an overall weighted outcome rank dependent value function against personal ‘psychological trade-off constraints’. The conventional notion of economizing as an allocation of scarce resources is replaced by a dynamic individual psychological process of continuously balancing PTB and PTC. All decision-relevant information is therefore endogenous, and the concept of ‘testing’ is introduced, which precludes both equilibrium and persistent non-systematic disequilibrium. This second, follow-on paper, derives two fundamental outcome dynamics of interaction - joint interactions and disjoint interactions, which address observations that are difficult to explain with equilibrium models, such as repeated boom/bust and fad/counter-fad cycles. A generalized Give & Take analytical construct is established that distills economic, psychological, sociological and political theories into a unified pragmatic framework, which is theoretically grounded and more easily applied in integrated fashion. Social policy and institutions are Pareto Optimal when they facilitate ‘coupling’ of PTB and PTC. Four Axioms of Freedom are provided as the basis for a FreeAccountable Society, a potential next phase in the evolution of modern capitalist democracies. Tremendous opportunity exists for further application of this cross-disciplinary model.

Key words: *Cumulative Prospect Theory, Psychological Economics, Give & Take Decision Theory, Matched Outcomes, Psychological Trade-off Constraint, FreeAccountable Society*

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1. Drivers of Interaction

This paper is the second of two core articles that together comprise Psychological Economics Theory, a generalized model of decision-making under uncertainty. The discussion in the first core article of Psychological Economics Theory, subtitled “Foundations & Individual Choice”, focused heavily on the application of the model to economic decision-making. However, the theory is equally a unifying pragmatic psychological, sociological and political decision-making model. Individual psychological theories, such as those discussed when developing the psychological trade-off curve, as well as theories in politics and sociology, explain specific relationships under specific conditions.

In all of the social science disciplines the theories must come to a head at the point of decision-making, the point at which humans form or revisit their view and either act upon it or forego acting upon it. This is the point at which all psychological factors that are relevant must be consolidated and prioritized, because the decision is the basis of the outlook of agents and all actions that agents take. It is here where a pragmatic distillation is required. Whether decisions are highly conscious or subconscious, the netting out of alternatives on instinctual, emotional and/or calculated criteria to select a course of action is fundamental to all of human activity and makes Psychological Economics Theory (Give & Take Economics) a unified model of decision-making. In the same way that all of economics has been traditionally distilled down to the supply and demand construct for effective application, Psychological Economics Theory distils all of human decision-making and action-taking, whether grounded in economics, psychology, politics, sociology etc., into the give and take construct (i.e. personal total benefit versus personal total cost).

In the context of complete transitory endogeneity (defined in the first core article, whereby all decision-relevant information is endogenously generated), when ascertaining the potential personal total cost and personal total benefit associated with each potential course of action for a decision, agents must consider not only their own potential actions, but also the potential actions of others that may impact them, as well as initially ‘exogenous’ factors in the state of the world. Each of these also has to be considered over the entire relevant time horizon. Each agent’s perceived potential utility can be impacted by the actual or anticipated actions of other agents.

Agents are at any point in time attempting to maximize their own lifetime utility. Various agents will place greater weight on utility derived in shorter-term periods, while others will emphasize increased utility derived in longer-term periods. This is not meant to trivialize the importance of altruistic/giving behaviour, but rather to capture the fact that all such activity still feeds back into an agent's personal total benefit and personal total cost preferences. Agents that are altruistic get tremendous personal satisfaction from their giving behaviour, which is what drives their decisions. As a means of achieving their objectives, agents will attribute one or more of four specific sources of value to various outcomes;

1. Consumption
2. Giving/Altruism
3. Saving
4. Speculation

These four sources of value are classified into two categories depending on how direct the ends are to the individual decision-maker.

- **Direct Ends:** Agents have an identified, direct end use in mind and are not seeking to put that desired event (single or multi-period) at greater risk. They may even be seeking to reduce the risk level associated with the identified direct ends. The two types of direct ends motivations are:
 - Consumption
 - Giving/Altruism
- **Indirect Ends:**
 - Savings: Motivated by the desire to mitigate risk and provide for future consumption or giving
 - Speculation: Agents are willing to take on risk through testing in pursuit of potentially larger rewards from that risk

When agents weigh potential personal total benefit versus potential personal total cost and interact with others in pursuit of their desired outcomes, their interaction will fit into one or more of three categories, depending on whether the interaction is primarily economic, generally psychological/social or political.

- **Market Interactions:** The typical construct of economics, representing transactional trade between agents.
- **Psychological/Social Interactions:** Represents the psychological and sociological interaction between individuals and groups.
- **Political Interactions:** Interaction occurs within a political system, producing calculated decisions around voting in democratic systems. Public Choice Theory (Black, 1958) very effectively casts political choice into a rigorous model.

2. The Give & Take Curves (A Generalization of Supply & Demand)

The interdependence of utility between agents underpins some key interaction dynamics related to the heart of economic activity, the transaction. Market ‘clearing’ is the execution of a transaction between a demander and a supplier, but in lead up there is a richer set of dynamics between all potential agents in a transaction. Each of the other potential demanders and suppliers in the market still have a potential direct impact on the actual transaction, as a result of their interplay. This interplay may exist solely during signalling prior to any actual transaction. As indicated previously, Psychological Economics Theory is also referred to as Give and Take Economics or Give and Take Decision Theory. Give and Take refer in one context to an individual’s balancing of personal total cost (give) and personal total benefit (take) and in a broader context to the interaction between individuals where one agent gives (supplies) and another agent takes (demands) some product or service. Agents approach each market interaction motivated by one or both of the following drivers:

- **Take** (desired PTB at each given PTC), including **Demand** (desired quantity at each given price)
- **Give** (acceptable PTC at each given PTB), including **Supply** (acceptable quantity provided at each price)

All market dynamics between potential and actual buyers and sellers materialize into three types of activities:

- Bidding (a signal to potential take)
- Offering (a signal to potential give)
- Accepting (a transaction occurs)

The classic supply and demand curves of economic theory are here generalized into give and take curves that show the full trade off between PTB and PTC when agents interact. The give and take terms here are applied to an interaction between agents, not to the internal give and take trade-off an agent makes with respect to the psychological trade-off curve.

The *give curve* is a generalized version of the concept of supply. It represents the PTC an agent is willing to bear when supplying the market in exchange for obtaining PTB from a transaction/agreement with the buyer. This may include a financial terms of trade ‘price’ and/or broader non-price ‘terms’ of exchange. PTC to the supplier includes the direct costs of producing and providing supply to the market and any ancillary costs, which may be financial and/or psychological. For example, the give curve of an agent will include the cost of production and distribution

associated with the traditional supply curve as well as additional costs, such as lost leisure time. These costs can be either financial or psychological, and either explicit or implied opportunity costs.

The *take curve* is a generalized version of the demand curve. It represents the PTB an agent is seeking to obtain through a purchase in exchange for bearing the PTC of parting with funds and taking on other related costs, whether financial and/or psychological. For example, an agent's take curve will include psychological PTB beyond the PTB associated with the quantity of goods obtained.

Even though every agent technically engages in both give and take in every interaction (suppliers give quantity plus other costs and take price plus other benefits, whereas demanders give price and other costs and take quantity and other benefits), where they are exchanging a common medium of exchange such as money, the term give or take is applied to the non-money (quantity) side of the transaction in which they are participating. Specifically, demanders are seeking to take a quantity of goods/services and suppliers are seeking to give a quantity of goods/services. An agent will engage in an interaction whenever they perceive their take to exceed their give. For example, a demander will by definition place higher value upon the good/service they desire than the value they place on the funds they must part with in order to enact the transaction. In traditional economic modelling of the market, this is represented as consumer surplus, measured by the distance between the equilibrium price and the demand curve. This generalized Give & Take interaction model can be reduced to produce the traditional Marshallian Supply & Demand partial equilibrium cross, such that Give=Supply and Take=Demand, through the following constraints:

1. PTC of the buyer is constrained to the price paid per unit times the number of units
2. PTB of the buyer is constrained to the utility of the quantity of the good obtained
3. PTC of the supplier is constrained to be the quantity of the good provided times the average total cost/unit
4. PTB of the supplier is constrained to be the price obtained times the quantity supplied

It holds that Demand is a subset of Take and that Supply is a subset of Give.

There are also three types of interaction:

- Interaction between Demanders & Suppliers
- Impact of Demand (Take) on Demand (Take)
- Impact of Supply (Give) on Supply (Give)

Interests between all of these parties can either be predominantly aligned, predominantly in opposition, or mixed, and in most cases evolve over time. Generalization of the supply and demand perspective into an internal psychological give and take perspective provides deeper insight into some common transactions observed in the economy. For example, traditional supply and demand cannot fully explain the market for maid services. ‘Supply’ is constrained by the current quantity of available maids, but most potential purchasers of maid services are generally able to clean on their own. It is the potential purchaser’s association of high PTC to cleaning and high PTB to alternative activities that explains why the agent is a demander of maid services in place of cleaning on their own, or even supplying such services in the market for that matter. All supply and demand is an outcome of Give and Take decision-making.

2.1. Demand (Take) Dynamics

The factors below represent shifts in the demand/take curve, which are in addition to the relationship of price/terms and quantity demanded along the demand curve.

Direct Ends Demand

- *Consumption Demand:* The traditional demand to acquire/access for identified short-term use/consumption.
- *Giving/Altruism:* The demand that results when a particular agent derives personal total benefit through helping others, in excess of the cost of doing so.

Indirect Ends Demand

- *Savings:* This is the traditional demand to acquire and hold savings, for future use, to provide a cushion that allows agents to meet their consumption and/or giving objectives over time, and to be able to deal with risks. It is the mirror image of speculative demand.
- *Speculation:* Demand triggered by speculation is based on perceived potential PTB to be obtained from taking on additional levels of risk. Speculative demand often generates further speculative demand and can produce the so-called Giffen Goods effect, where price increases trigger further demand. Agents are often aware that speculation can result in lower levels of future direct ends demand to the extent that an agent is negatively impacted by a boom and bust cycle, as will be discussed subsequently.

These are the fundamental sources of demand. Various behaviours stem from these, including complementary demand, substitution demand and bidding strategies.

2.2. Supply (Give) Dynamics

Supply is not an end state objective in itself, but rather a means to an end. Agents do not supply effort or resources absent of the desire to use the fruits of supply to meet an ultimate demand objective. A number of factors impact the

supply/give curve. Those shown below represent shifts in the supply curve, which are in addition to the relationship of price and quantity supplied along the supply curve.

- *Rationing*: Supply can be restricted to create scarcity and elevated prices/profits. As long as competitors cannot readily enter to supply, this tactic will be rational to suppliers. This is monopolistic behaviour in the case of a single supplier. Suppliers can also collude to create oligopoly-like supply constraints.
- *Undercutting*: As markets become more competitive and as companies try to build market share, suppliers will often undercut each other.
- *Innovating*: Suppliers may find ways to innovate, creating a ‘new’ market for the innovated solution to reduce the impact of existing competition.
- *Duplicating*: Suppliers often copy another supplier’s offering in an attempt to obtain a share of the demand.

2.3. Give (Supply) & Take (Demand) Dynamics

Testing behaviour (defined in the first core article of Psychological Economics Theory), as applied directly in market interaction, is captured by agents putting forward bids and offers not equal to prevailing market bids and offers, or to most recent transaction prices. Bids are placed below current observed market prices/bids and offers above current market prices/offers. Bids and offers can be made to reflect true needs or even to incorporate deceptive behaviour if agents feel they can potentially increase personal total benefit net of personal total cost with sufficient probability. Testing often includes signalling, where the testing behaviour is meant to send a message to other participants in an attempt to gain advantage, such as by creating speculative demand. Overall market interaction dynamics range broadly in theory between perfect competition and monopoly, depending on both the level of competition and the strength of the need of demanders. Market power can be captured on a market power scale as follows:

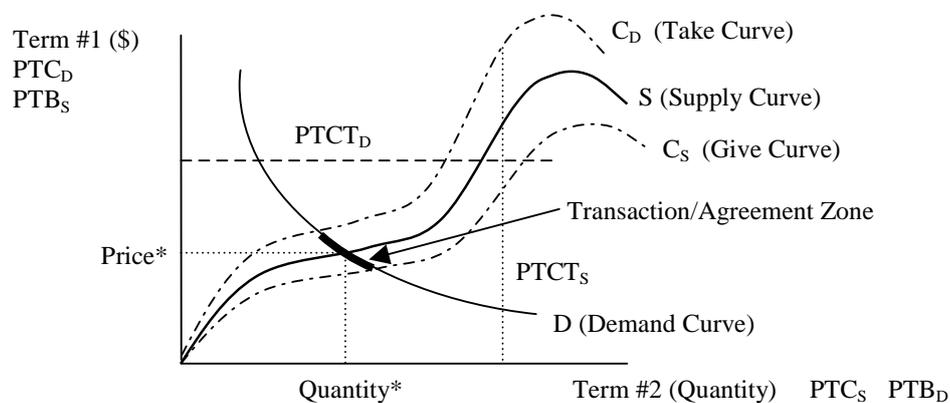
Figure 1: Market Power

Maximum Supplier Power	Maximum Buyer Power
Strong Buyer Need	Weak Buyer Need
Minimal/No Competition (Monopoly)	Strong Competition (Perfect Competition)

The great majority of real world market interactions will be in a context somewhere between the theoretical extremes of pure monopoly and perfect competition, representing a partial alignment scenario between giving and taking agents. In this majority of circumstances market interaction between demanders and suppliers, suppliers and suppliers and demanders and demanders over time horizons is best modeled with game theory - specifically a stag

where this generalization includes economic transactions, psychological/social negotiations and political interactions between directly dependent agents. The concept of a direct ends joint interaction will be discussed subsequently along with other types of interaction outcomes. As discussed previously, a leaning X diagram can be drawn whenever an agent can intuitively convert all PTC and PTB into a scale based on a common and important 'barometer', such as financial impact measured in a common currency unit. Similarly, whenever interacting agents can both relate their overall PTC and PTB in terms of units of currency and units of quantity of a good, we can generalize the typical supply and demand schematic into a give and take schematic, as shown in Figure 3.

Figure 3: Decision-making 'clearing' (transaction or agreement) between Agents



Transactions/agreements will be reached when:

$$D(\text{Price}^*, \text{Quantity}^*) = S(\text{Price}^*, \text{Quantity}^*)$$

Where;

$$PTCT_D(\text{Price}, \text{Quantity}^*) > C_D(\text{Price}, \text{Quantity}^*) > D(\text{Price}^*, \text{Quantity}^*) = S(\text{Price}^*, \text{Quantity}^*) > C_S(\text{Price}, \text{Quantity}^*)$$

and,

$$C_S(\text{Price}^*, \text{Quantity}) < PTCT_S(\text{Price}^*, \text{Quantity})$$

This construct has some key nuances that can make a significant difference in comparison to the traditional, unaugmented supply and demand construct. The area below C_D represents the potential agreement zone for the potential demander and the area above C_S represents the potential agreement zone for the potential supplier. The section of D between the C_D and C_S curves represents the zone of potential transaction/agreement. The locations of S

and D pinpoint through their intersection where an agreement/transaction can occur. The horizontal distance between S and C_S represents the additional PTC the supplier is willing to take on in addition to the direct cost of producing units of quantity at a given price. If the C_D curve is vertically below the C_S curve, then there is no alignment between agents, and no transaction/agreement will occur. This is because in the situation where the C_D curve is below the C_S curve, at each quantity point, the potential supplier requires a price higher than the potential demander is willing to pay. Where the C_D curve is vertically above the C_S , there is partial alignment between agents and gains from trading/interacting can result within the zone between these curves. In this zone, D provides greater quantity at a given price than required by the demander's trade-off curve, C_D , and S provides a greater price at a given quantity than required by the supplier's trade-off curve, C_S . Gains from trade result, even though each agent must bear PTC in order to engage in such a transaction/agreement. If the intersection between S and D is outside of the box bounded by $PTCT_S$ and $PTCT_D$ then transaction/agreement cannot be reached as at least one agent's threshold would be exceeded.

3. Interaction Outcome Dynamics

3.1. *Equilibrium and Disequilibrium Dynamics*

Equilibrium is not applicable in Psychological Economics Theory. This is because economic environments can in reality only exist as an aggregation of the activity of individuals within the context of cumulative counter agent effects. General equilibrium models of the economy start with system equilibrium conditions not attributed to the actual cumulative behaviour of agents. These models then impute the decision-making context of the individual by moving backwards from an imposed equilibrium and assuming that agents have all necessary information, motivation and computational ability such that their actions will lead to the equilibrium scenario with complete certainty. In mainstream general equilibrium theory a variety of constructs are employed to ensure that the behaviour of agents results in an equilibrium situation. These constructs in general consist of:

- Rational agents (from a motivational perspective)
- Most typically, agents with homogenous, identical preferences
- Perfect intertemporal knowledge and computational ability without search costs
- Perfectly competitive markets for information and all contingency risk transfer across the entire time frame relevant to each decision, without transaction costs

Once these unrealistic assumptions are even slightly relaxed the predictive power of the model disappears, as a large number of outcomes can then result. The most significant problem with equilibrium approaches is that the real world economy does not even closely align to the highly constrained scenarios of the stylized general equilibrium models, such as those of Debreau/Hahn/Patinkin. In such mainstream theories the individual effectively becomes irrelevant. An 'aggregate' is directly defined, not as the aggregation of the explained actions of individual agents. In this construct individuals are effectively defined to have no individually directed economic impact. However, by very definition, an aggregate can only exist as an aggregation across individuals.

Relying on the general equilibrium model is somewhat like assuming that a particular transaction will occur at a precise moment in time and then assuming that everyone will know that there is to be such a purchase and will then conduct themselves accordingly to ensure that it in fact happens. To arrive at a precise point value outcome, the equilibrium approach to economics typically assumes that all agents are homogenous and that all information is known, being conveyed through costless and instantaneous markets that ensure every piece of relevant information and that every potential contingency (all considered exogenous) is conveyed and confirmed. In fact, to avoid disequilibrium we have to assume either that all agents are the same and known to be so, or that they are different but with all lifetime preferences known, made public and known either as a starting point in equilibrium or via costless, timeless transacting. Full knowledge of lifetime preferences means that each agent knows exactly how they and others would react in every possible state of the universe, even if they have never experienced similar states.

Assuming costless transactions isn't enough to ensure equilibrium, because transacting reveals only the clearing price, not the intentions of other agents above and below the clearing price. In many general equilibrium models, not only must every agent effectively know the future, they must also know all potential 'alternative futures' that won't actually occur. The economy therefore either starts at and stays in equilibrium, or instantly obtains equilibrium if there is a postulation that it did not start there. With no uncertainty and a fully deterministic world, actual transactions, and hence economic activity in general, become irrelevant concepts. This is clearly not a pragmatic model for use in studying economic activity.

The major conclusion of this analysis is that whenever uncertainty is greater than zero (where uncertainty includes less than full knowledge of the complete lifetime utility and trade-off constraints of others), testing behaviour precludes the traditional concept of static equilibrium, whether partial or general, across markets. Testing behaviour also precludes even a steady state equilibrium over time. For this reason we replace reference to *equilibrium* with the new concept of *interaction outcomes*. In the economic context these are known as *market interaction outcomes*.

When we think beyond market activity, the broader concept of *interaction outcomes* also contains *psychological/sociological interaction outcomes* and *political interaction outcomes*.

For the reasons discussed, general equilibrium is a misleading construct. Having excess demands ‘offset’ each other, where there is no economic necessity for this to occur at the level of the individual, is similar to an accounting example of inventing a debit and a credit each called ‘useless’ and saying they balance, because if one were to change, the other would as well to restore balance. They do indeed balance, but the ‘useless’ on the books adds no insight other than being a bookkeeping entry that balances, nothing more. In the general equilibrium approach, all markets clear immediately and we then essentially figure out what each agent must do to make that happen. In the physical world we rarely if ever see equilibrium prevail, since inputs to the system are continually changing. As a result, the richness of the equations employed in natural science is reflected in their ability to thoroughly explain processes in action, much more so than describing only conditions for equilibrium. This is the approach that must also be taken within the social sciences. If equilibrium situations are to be modelled in economics, or any other social science, they must be the result of robust modeling of the non-equilibrium behaviour of agents.

The assumption of perfect competition in many mainstream models illustrates the inappropriateness of starting with a presumption of equilibrium and then imposing necessary conditions as assumptions that will produce that result. In such a perfect competition approach, a price that solves equilibrium equations is purported to directly and immediately exist. Equilibrium ‘just occurs’. Agents are all price takers of a price that no individual actually sets. There is no actual dynamic of interaction between economic agents that logically exists in the model. As soon as interaction is conceived, even if it is as a means of moving to equilibrium, a dynamic for interaction must be defined. This equilibrium concept contains a fundamental flaw that renders it useless, because as a model aimed at

explaining the outcome of economic activity between agents, the one thing that it assumes away is the actual activity between agents.

Something not given due attention in a great deal of mainstream modelling is the fact that as soon as we relax the assumption that all agents are homogeneous and know each others' preferences exactly - an observation that is borne out with statistical certainty in the real world - all other assumptions of the neoclassical / rational expectations construct also necessarily collapse. It is not strictly the existence of non-homogeneous preferences across agents that results in this breakdown, because prices and quantity allocations can be theoretically determined that support an equilibrium that contains these different preferences. The neoclassical/rational expectations approach breaks down when there are different preferences across agents and when these differences are not perfectly known by all agents. This includes less than full knowledge of preferences across all contingent scenarios and across all future time periods – effectively anything other than a zero uncertainty environment (an ability to 'know the future'), at present and infinitely into the future.

If we are to suppose no uncertainty, this condition must itself be the result of either starting in equilibrium with full information known to all or by arriving instantly at equilibrium after all necessary convergence transactions have already occurred through all markets. In either case, this is a world of no economic activity, equilibrium being precisely the set of conditions necessary to ensure absolutely no need for economic activity/trading going forward. This would be somewhat analogous to the medical profession not seeking to understand the behaviour of diseases, by defining a model that does not provide for the sustained existence of diseases. Just as the real world has diseases, the economy is always in uncertain motion. These are the conditions which must be explained and understood.

This leads us to understand that for economic activity to actually exist as an active behavioural process of transacting in a world of uncertainty, equilibrium can't exist. A pure equilibrium of the type characterized by the rational expectations, neoclassical, Walrasian type of model has no robust disequilibrium dynamic – since the economy is in equilibrium there is no actual economy, because there is no economic activity. Equilibrium should hardly maintain dominant presence in the study of economic activity. The equilibrium-driven line of reasoning

leads to unrealistic outcomes such as the very well known investment aphorism that ‘there can be no \$100 bills lying in the street because someone else would have picked them up’.

As soon as uncertainty is recognized to exist, economic activity necessarily follows, because rational agents will *test* to seek potential net gains from transacting. Since additional information about other agents is revealed through transactions, we have the necessary condition of a series of transactions. Since each transaction will take some positive amount of time, no matter how small, the result is that time, no matter how small, must pass, as the chain of transactions unfolds. The consequence is that the immediate market clearing without passage of time often assumed in many ‘Walrasian-type’ mainstream models is also not realistic.

Our discussion concerning equilibrium is not limited to fixed-point stationary outcomes. We consider a point of view broad enough to capture the rich range of equilibrium concepts. Lucas’ approach of introducing separate ‘market-clearing islands’ (Lucas, 1972) introduced imperfect local information across agents, resulting in local versus global price points. A constrained, semi-strong form of rational expectations equilibrium is produced in these situations. Lucas’ resulting Equilibrium Monetary Business Cycle model uses this concept to explain aggregate economic fluctuation, constituting the first of two major neoclassical approaches to explaining the business cycle (Mullineux et al., 1993). The second major neoclassical model advanced to explain aggregate economic fluctuation is that of Equilibrium Real Business Cycle theory. In this approach dynamic fluctuations are introduced by way of distinction between temporary and permanent shocks with propagation through production lags or complex input-output structures (Mullineux et al., 1993).

New Keynesian theory advances additional ideas regarding the nature of the business cycle, by leveraging differences between actual and planned demand that have real impact through the Keynesian consumption and investment multipliers. These include the concepts of the dual decision constraint and the constraint of prior possession as advanced by Clower (Walker, 1984). Along similar lines of thought, Friedrich Hayek (Hayek, 1928) made great strides by delineating the concept of a moving, intertemporal equilibrium, whereby expected future disturbances impact current decision-making and *visa versa*.

However, none of these approaches generate an endogenous trend and following counter-trend, because they rely upon separate exogenous triggers to each phase. This means that a boom is not necessarily followed by a downturn. Conceivably the models allow a series of subsequent booms without correction. Even though the insights of these models represent great strides in understanding, because we never observe equilibriums in reality, it does not make sense that we would rely on any economic theory that only truly explains equilibrium, with no robust dynamic concerning disequilibrium. In similar vein, when we see regular oscillation between trend and counter trend in practice, it makes sense that we should employ a model that endogenously explains such observations.

Psychological Economics Theory does not bear these equilibrium-related flaws, as it is built up from an individual decision-making perspective, not working backwards from a stable system perspective. Decision-making only occurs at the individual level, taking into account system parameters. Decision-making is not an aggregated endeavour. The collective only exists as the sum of the decisions of individual agents. The aggregate economic outcome dynamic prevailing in Give and Take Decision Theory, as an alternative to the mainstream Walrasian/Patinkin style general equilibrium, is built up as a continually moving aggregation of changing individual actions. Psychological Economics Theory concludes that this interaction and accumulation of activity will be systematic and hence very broadly predictable, albeit without precision. Give and Take Decision Theory's focus on individual decision-making and action follows insight of by The Austrian School of Economics (von Mises, 1953).

Psychological Economics Theory is neither an equilibrium theory nor a disequilibrium theory. It is by contrast a *cyclical outcome* model. This is an important distinction, because equilibrium theories predict that activity will continuously work to bring actual outcomes in line with the equilibrium outcomes – disequilibrium being a temporary transition to equilibrium. Disequilibrium models on the other hand generally do not assert that activity follows any systematic process. The latter typically focus more on dismantling equilibrium based models of the economy and showing that the economy cannot be in equilibrium on a sustained basis.

The convergence dynamics of the traditional concept of equilibrium are however clear and do help explain a significant amount of market interaction. As a classic example, if one agent was to place his or her wares on the market at a very low price relative to other offers, many more demanders would enter the market, and many

suppliers would pull out of the market. These actions would push the price back up toward the original price, due to less supply and greater demand. However, mainstream economics does not put forward a theory to ensure that this process is robust from discrete transaction to discrete transaction over time. Nor does it allow any speculative demand to enter the context. By contrast, Psychological Economics Theory predicts that convergence will not occur where speculative demand exists.

In the majority of mainstream models equilibrating forces have been the only type to receive significant consideration, especially in light of the expectations revolution brought on by Lucas and others, which asserts that on average the individual and resulting collective expectations of agents will be approximately correct and converge to the 'correct' equilibrium. To the extent that Psychological Economics Theory is systematic, it may seem to make sense to suggest that agents will understand this and adjust expectations accordingly, removing the systematic cycle. In reality agents do know that business cycles and bubbles occur and that costs to society will occur, but it is still rational in the context of Give and Take Economics for them to act in their own interest and participate in such trends to the extent that their personal gain is expected to be higher than the share of societal losses they may bear.

To this point, our discussion concerning equilibrium has incorporated only exogenous information, as this is generally what mainstream theory accommodates. The neoclassical economic problem, carried out in an equilibrium world, is effectively reduced to a Robinson Crusoe type of shuffling of a quantity of existing goods and services between agents that have most if not all required information and certainty about the actions of others, such that equilibrium values result (Kirzner, 1976). From this point of view economics is simply about basic production and allocation, with no room for entrepreneurship and creative innovation. In today's modern information and technology economies this is not a sufficient form of modelling.

Kirzner emphasizes Ludwig von Mises' concept of entrepreneurship and human action, which focuses on economic activity as the result of individual self-interested actions (Kirzner, 1976). The Austrian School of economic thought focuses on the individual as decision-maker, a foundation on which Psychological Economics Theory builds. Austrian theory allows us to conceive of economic agents that proactively and reactively seize opportunities and avoid threats, acting to their advantage – as humans – not simply as economic agents. Individuals don't necessarily

have access to much relevant information, but they seize what they can and then act. This approach leaves little if any potential to achieve a neoclassical style equilibrium. It is however important to note that neither the Neoclassical, New Keynesian nor the Austrian approach adequately recognizes the full psychological nature of economic decision-making, as they each focus on intrinsic economic values, whether known to agents or not. The 'intrinsic' or 'natural' value of economic quantities is one of the most rooted concepts in economics, going back to the earliest classical thinkers. Natural levels of interest, capital/labour ratios, technological growth etc. are ingrained into our thinking about economic quantities.

This is another key divergence point of Give and Take Decision Theory. Economic values aren't universal. There are no 'natural' economic values waiting to be 'revealed' to agents. Economic values are first and foremost subjective psychological values. There is no 'natural' value for an interest rate, just as there is no 'natural' value for a red t-shirt. Disco music had incredible value in the 1970's, and has almost none in 2010. Its value was not intrinsic. Its value, like any other, exists only when some agents endogenously consider it to have value, which is often the result of speculation/fads. An uncomfortable reality for many economists is that fads and the whimsical tastes of people, including the impact of crowd psychology on individual tastes, can actually be the source of underlying values. In social decision-making these subjective values have the weight of a natural force in physics.

Because Psychological Economics Theory conceives that all perceptions are based on ascertainment of personal total benefit and personal total cost, and because all information is endogenous, value can be established as long as at least one person feels that there is value. Value can be further reinforced when at least two people agree that there is value, via a transaction. Traditional economic theory is heavily biased toward associating value with the purported 'intrinsic' value of a product or service. In the generalized approach of Give and Take Economics, value is fully determined by agents' perceptions of value (only imbued through the netted out PTB and PTC perceptions of agents). To the extent that any value attributes to an underlying product or service, it will necessarily be perceived by agents and interpreted as per the value and weighting functions.

Consider as another example a fashion line of clothing where the designer label does not reflect superior quality of the goods, but rather has a 'cool' factor. The value that buyers of the clothing obtain is social acceptance and all of

the associated psychological rewards. In such a case they have completely projected their perceptions on to the fashion product under consideration. As other agents follow the leaders, they form their own perceptions subject to this influence. Another interesting example is the market for music. Two agents may personally value a particular style of music very differently, and its reasonable price will be very different to the different agents as a result. The music has no inherent value, only value to particular agents at a particular point in time.

Why is this discussion into the nature of value relevant to Psychological Economics Theory? It is important because the incorporation of personal total cost into every decision is essentially ensuring that a full psychological opportunity cost is an explicit part of the decision-making process. Making a particular decision and taking a particular course of action precludes some direct and indirect alternatives, resulting in both direct financial and psychological elements of opportunity costs. Mainstream economics focuses primarily on information and specifically information with a financial impact. This is a significant gap in mainstream modelling. Decision-making in a psychological context expands the concept of opportunity cost to capture the personal total cost of all the effort required to take an action, even if that cost has no financial implication. Some agents will compare alternative outcomes on a solely financial scale, and some will utilize other scales, such as the well-being of their family or the level of consistency with certain priority beliefs.

Some additional examples will serve to illustrate that information is only relevant as an input to the formation of perceptions of PTB and PTC. Many people in our economy know what type of effort and action they would have to put forth to try to build a massive company. There is no missing set of information they just need to uncover to make it happen. Many agents are not interested in putting forth the massive effort with the associated personal total cost (direct financial and broadly psychological, such as lost leisure) to go for it. Many individuals struggle for years with no apparent results, only to finally see payoff from their efforts, which appear to come `overnight` to onlookers. With the passage of time we regularly see new entrepreneurs rise up through persistent, sustained effort.

These are extreme examples, but many simpler examples show where people choose not to pursue further economic opportunities given their psychological mindset. Not everyone wants to pursue advanced education, become entrepreneurs, and learn how to trade stocks or buy and hold real estate. These are logical and consistent decisions

for many individuals that place greater emphasis on non-financial incentives, which could be time with family etc., or even just leisure. The key takeaway is that the decisions of agents are almost never just a function of the information at hand. The Give and Take decision-making construct, which builds on the foundation that all agents are heterogeneous to their genetic core and face uncertainty, easily accommodates a world in which ‘super entrepreneurs’ and unskilled labour all exist side by side. Their mindsets and subsequent life choices are driven by their differing personal psychology.

4. Types of Interaction Outcome Dynamics

In an environment where a number of agents are interacting or potentially interacting, and where all information is endogenously revealed, agents undergo iterative decision-making and exhibit testing behaviour. Agents therefore make a judgement about the values of each prospect, f , a priori to a transaction. Once a transaction occurs, or even through price and non-price signals in advance of a potential transaction, new ‘information’ will be created, which may cause agents to reappraise their judgements concerning each prospect. Even if agents are not presented with new information, they will still seek to obtain additional information by testing, taking on small incremental personal total cost in order to potentially uncover additional personal total benefit.

The existence of complete transitory endogeneity (defined in the first core article, Foundations & Individual Choice) and testing behaviour within the context of uncertainty precludes equilibrium, however, we have not yet established the full nature of the interaction outcome that replaces the equilibrium concept, other than to say that it is a systematic cyclical outcome process. Because all decision-relevant information is endogenously generated, that which does come forward will not necessarily indicate even the direction of the greatest cooperation between agents. Information facing the decision-maker could be that of agents cooperating fully and letting their price and non-price terms move toward perceived cooperation with counter parties, or it could be testing behaviour in the opposite direction as an agent tries to do better, attempting to get the other party to yield further. As an example, suppliers will routinely try to obtain higher prices to see whether they can obtain them and buyers will routinely lowball by comparison.

There are two fundamental theoretical types of interaction outcome dynamics that can result in Psychological Economics Theory - *joint interactions* and *disjoint interactions*. The one that applies in a given situation is determined by whether or not the interaction is one to obtain direct ends or indirect ends. Joint interactions encompass those where the agents interacting are all directly involved in meeting identified short-term needs, whether to consume or to altruistically give to others. Disjoint interactions encompass those where some agents interacting are indirectly involved and where interaction is time removed, whether the objective is to save or speculate. An example of disjoint interaction is a series of stock transactions over time between different groups of individuals. Such a market is not driven by the satisfaction of immediate direct needs, but fundamentally relies upon the outcomes of subsequent transactions as agents speculate on a series of future indirect transactions.

As a matter of convenience six potential outcome dynamic types are referenced in practice, a result of distinguishing between outcomes that are predominantly economic in nature, those that are predominantly political in nature, and those that are predominantly psychological/sociological in nature. However, most societal issues truly span multiple areas of social science and hence justify use of the generalized terms, *joint interaction* and *disjoint interaction*.

Figure 4: Summary of Interaction Outcome Dynamics

Fundamental Interaction Outcome Types & Dynamics			
		Joint Interaction	Disjoint Interaction
		<ul style="list-style-type: none"> Agents motivated by direct ends Agents directly dependent Produces Transaction/Agreement/Policy Random Walk dynamic with potential random mini oscillating trend and reversal 	<ul style="list-style-type: none"> Agents motivated by indirect ends – saving (risk-reduction/maintenance) or speculation Agents indirectly-dependent When speculation exists, outcome dynamic is oscillating trend and reversal with potential randomly dispersed white noise
Category of Interaction	Market (Economic)	Transaction (Consumption, Giving)	Transaction (Saving: risk-reduction or maintenance) Boom & Bust Cycle of Transactions (Speculation)
	Psychological/Sociological	Negotiation	Status Quo (Risk-reduction or maintenance) Fad & Counter-Fad Cycle (Speculation)
	Political	Vote (Policy, Law)	Status Quo Voting/’Leaning’ (Risk-reduction or maintenance) Left/Right Leaning/Voting & Reversal (Speculation)

The first type of interaction outcome dynamic, a joint interaction, which occurs when directly dependent agents interact for their own immediate and identified ends, produces the dynamic of a random walk with potential mini oscillating trend and reversals occurring randomly. The second type of interaction outcome dynamic, a disjoint interaction, comes to bear as an interaction between indirectly dependent agents. When based on speculation, disjoint interactions produce an endogenous movement in one direction that builds upon itself, creating incremental speculative demand, which is then followed by an endogenous reversal in the opposite direction – creating an oscillating trend and reversal dynamic. When motivated by risk reduction or risk maintenance, disjoint interactions produce a random walk dynamic with potential random mini oscillating trend and reversal.

4.1. Market Outcomes

Joint Interactions – Transactions (Consumption, Giving)

In Psychological Economics Theory, bids, offers and prices will not maintain steady equilibrium values. When interactions centre around direct ends (consumption or giving), with agents seeking to demand/take and supply/give in exchange for compensation or consideration directly for that exchange, it is typical that the bids and offers of market participants will move toward cooperation to allow the completion of transactions and/or agreements. This moving toward cooperation of bids and offers reflects the fact that agents considering a transaction typically have less to gain and more to lose if a transaction/agreement is not secured. Moving to cooperation does not entail convergence to a single, recurrent market price, since bids and offers will still vary and testing will still occur in an attempt to pull prices up or to push prices down. As a result, these direct ends markets exhibit a *white noise* pattern, with some potential for random short oscillating trend and reversal patterns in bids, offers and prices. Relatively low levels of variability exist around actual transaction prices and it is very typical that bids and offers will vary more than actual transaction prices. Relative market power will determine the actual nature of testing in each market. For example, in the case of large-scale consumer goods markets, where many small buyers demand from a smaller group of organized retailers, there will be little if any testing via bidding on the part of demanders, but there will be regular testing of offer prices by supplying retailers.

Disjoint Interaction – Transactions (Saving, Speculation)

Disjoint interactions occur when agents with indirect ends interact. These indirect ends can be driven by a desire to save or by a desire to speculate.

Saving

Agents that are interested in mitigating risk and providing for future direct ends (consumption and/or giving), will engage in savings related transactions that reduce risk and provide for a relatively certain amount of future funds.

Speculation

The observation of *oscillating trending and reversal* in economies and societies in general, such as business cycles and fads/counter-fads, results directly from the nature of speculation, which can be created and grow in disjoint interactions. Endogenous information and testing behaviour in the face of uncertainty are all that is required to produce speculation and an associated oscillating trend and reversal outcome dynamic. Speculation has been defined previously as coming to exist when an agent takes on risk in pursuit of a higher potential reward from taking on that risk, where they specifically expect both reward and risk possibilities in excess of the expected certain components of PTC and PTB. Speculative situations occur whenever agents feel that it is possible or likely that their prospects are better when participating in the speculation versus not participating in the speculation. This is fully reflective of perceived PTB and PTC, which may or may not accurately reflect actual outcome probabilities and magnitudes. An endogenous reversal occurs during speculation at the point when a number of agents feel that their prospects are overall better by giving up further potential gains in favour of lowering risk.

This dynamic reflects the reality that in a world of cumulative counter agent effects many outcomes are significantly beyond an agent's control in the short to intermediate-term and exhibit a bell-shaped distribution centred around an observed trending average value. The number of agents that start to bet against a trend eventually increases as the trend goes on. No matter how strong an up trend, perceived risk will eventually elevate as outcomes consistently push into the upper end of the bell curve. As trends gain strength in their early stage, optimistic perceptions can quickly push the entire bell curve higher and even result in a heavily right skewed distribution, placing higher subjective probabilities and magnitudes on reward outcomes over risk outcomes. All it takes is a small number of

agents to begin to push in the direction against the trend due to a heightened perception of risk, and the masses may begin to move in tandem, creating an endogenous reversal.

Whereas the traditional law of large numbers produces a relatively steady price (random walk) in non-speculative interactions, large numbers of agents create amplification of the oscillating trend and reversal dynamic in speculative interactions. In essence more and more participants ‘jump on’ to the trend and add greater certainty to the developing moving average value. When risk levels increase to the threshold point of some individuals, these agents start to feel that the counter trend is a better prospective situation. Eventually, the actions of the agents speculating on the counter trend push the existing trend in the opposite direction, even attracting on board many of the participants in the initial trend, as they now see high risk in sticking to the original trend, and want to exit their positions. Variance will typically increase with an increasing right (personal total benefit) skew as the trend advances and then increase greatly during the downtrend, with an increasing left (personal total cost) skew.

Theorem – The Social Law of Large Numbers

As the number of agents involved in interaction increases toward infinity, interaction outcome dynamics will occur, such that;

1. Where all agents are fully motivated by direct ends or the indirect end of saving, a random walk will result with stable or decreasing sample variance as observations closely track the population moving to cooperation.
2. Where agents are primarily motivated by the indirect end of speculation, oscillating trending and reversal will become more engrained. Sample variance increases until completion of the endogenous oscillating trend and reversal cycle.

It is important to note that there is no underlying population distribution that already exists, to which a sample distribution is matched. The distribution is a simultaneous system of time series generated through endogenous activity in real time.

Most speculative trends consist of an upswing followed by a downswing but they can be ‘bearish’, first producing a downswing followed by an upswing. Agents will perceive a distribution of potential duration and magnitude regarding both the upswing and downswing of a cycle. The upswing of trends is generally gradual as more and more people get on board and prepare themselves for increased risk, where the level of risk is still in the ‘middle’ of the bell curve. The downswing is typically very fast as fear and panic set in at the end of the upswing, reflected in an ever decreasing probability that outcomes push further and further out into the reward from risk tail of the distribution. This is a systematic cyclical outcome, a disequilibrium dynamic very different from a random walk around an ‘equilibrium’ outcome.

The existence of speculative bubbles (economic, sociological, political) flows from Psychological Economics Theory with full rationality in the context of larger groups of participants, due to the testing dynamic and the endogenous nature of economic values. Speculative demand is a real demand and a recurrent, common demand. Booms and pullbacks occur when speculative demand naturally develops, with testing behaviour serving as the initiator, the enabler and the turning point. Speculation can begin to occur even when agents do not have any perception of risk relative to reward from risk, since testing will drive some agents to take on a small amount of risk in order to seek out potential reward from risk. This alone can be the starting point to actually introduce speculative value. As noted earlier, value can exist to facilitate either consumption, saving, altruism/giving or speculation. Speculative value can exist solely based on the expectation that others will recognize the same value – there is no necessity for any underlying direct ends value. With any increase in perceived reward from risk relative to perceived risk, agents will test more assertively, incrementally increasing the possibility of a speculative trend. A number of expected conditions contribute to an attractive environment for speculation:

- Variability (uncertainty)
- ‘Liquid’, actively traded markets
- Large populations
- Long time horizons
- Instruments with direct ends value and store of value properties

Expectations or observations of increases in any of these drivers may transform direct ends markets into boom/bust cycles and traditional negotiations may be transformed into fad/counter-fad cycles. Fad/counter-fad trends will be elaborated upon subsequently. Variability provides for the potential of personal total benefit through reward on risk. Liquid markets allow participants to easily buy and sell to speculate, giving confidence for additional, follow-on participants. The liquidity of direct ends markets is what makes them particularly attractive as an environment in which speculation may form. Large populations mean that large numbers of agents can participate and place bids and offers in support of the trend. An often used colloquial interpretation is that with large populations each agent can reasonably expect a ‘greater fool’ to come on board next. Due to differing perceptions of risk and reward from risk, many other agents, not necessarily ‘fools’, do indeed often have reasonable grounds for coming on board within a cycle.

Longer time horizons mean that ongoing speculative value can be confirmed as some agents forego direct ends transactions in order to speculate for the longer-term. Instruments imbued with direct ends value and store of value properties are ideal as speculative instruments, as they also provide an underlying direct ends ‘usage value’ as a fallback, in addition to the existence of consistently liquid markets. This serves as an ideal way to reduce risk relative to reward from risk. Gold, precious metals, commodities, and stocks and bonds fit this set of criteria very clearly. All of these factors can be measured in the speculation coefficient. As an agent’s motivation to speculate grows, their speculation coefficient increases.

Theorem: Oscillating Trend and Reversal

Speculative value will be created whenever Φ , the speculation coefficient, as defined below, exceeds 1. As the level of speculation increases the value of Φ increases. When $\Phi > 1$ for at least one agent, that agent will test and potentially create a speculative trend. The price change that occurs as a result may push $\Phi > 1$ for a number of other agents, adding momentum to a speculative trend and reversal process. Where PTB_R is the expected PTB resulting from reward from risk and where PTC_R is the expected PTC resulting from risk;

$$\Phi = \frac{PTB_R \{ w^{(+)}(p_{Uit}), v^{(+)}(P_{Uit}) \}}{PTC_R \{ w^{(-)}(q_{Uit}), v^{(-)}(Q_{Uit}) \}}$$

Once overall personal total cost (PTC) reaches the personal total cost threshold (PTCT) for one agent, whenever their Φ meets the condition that $\Phi < 1$, an endogenous reversal to a speculative trend may get underway as more and more agents have potential to perceive $\Phi < 1$.

Speculative testing will most often result in demanders bidding above current market price levels, and/or suppliers asking above current market price levels, each attempting to gain from reward from risk and prepared to take on some risk that the trend does not continue. In modern financial and commodity markets there is also a significant amount of speculation on the downside, whereby agents drive a downward ‘bearish’ or ‘short’ trend by pulling down bids and offers. The repeated existence of both bullish and bearish cycles is an observation that supports Psychological Economics Theory very well, underpinning the reality that speculation is its own rational source of potential value to participating agents. Even though both types of cycles do occur very regularly in real world economies, it is important to note that in most equity-based markets there is a long-term bias to the upside reflecting the profit generating activities of companies.

As noted previously, speculative testing and oscillating trending and reversal are amplified as the level of variability (which includes both risk and reward from risk) increases. Reward from risk provides the potential upside to

speculation and risk provides the potential downside. As long as perceived reward from risk exists and that it is also perceived as sufficiently higher than perceived risk, testing will accelerate, which may also create or accelerate speculation. Variability is most often the result of longer time horizons and larger populations of interacting agents, because these conditions provide greater opportunity for speculative testing to exist and to build on itself. Longer time horizons allow speculative value to be created either in fully speculative instruments or as an additional component of value in direct ends products/services. With longer time horizons more agents can direct funds and/or effort from direct ends activities in the current time period toward speculative activities that are expected to yield reward from risk in future periods. Each agent that speculates produces a slightly higher chance that others jump on board through an increase in perceived likelihood of the cycle gaining momentum.

Speculative demand is often highly emotional, and as a speculative cycle gets underway, it is commonplace that participants begin to systematically overestimate the certain component of PTB and the expected reward from risk as well as to systematically underestimate the certain component of PTC and the expected level of risk. This reflects a fully rational optimistic bias. It is also commonplace that during the downside of an oscillating trend and reversal, the certain component of PTC and risk will each be overestimated and the certain component of PTB and expected reward from risk will also each be underestimated. This dynamic reflects a fully rational pessimistic bias. Repeated cycles of upward trending and subsequent reversal of market activity are a common observation in real world economies and social movements. The existence of these cycles is an inconvenient deviation in equilibrium models. Mainstream economic theory would suggest that all new information revealed helps to clarify and move all agents toward equilibrium levels rather than producing recurrent cycles. By contrast, market cycles and broad social cycles are a core theoretical implication of Psychological Economics Theory.

Therefore, testing, which seems like a trivial distinction in direct ends markets, becomes a vital trigger of a very different dynamic in indirect ends markets that become speculative. As previously discussed, when speculative demand is created by some agents, it can feed on itself as other agents adopt a similar perspective. Speculative demand can form in many areas, such as stocks, bonds, real estate, art, commodities, currencies, fashion trends, political views, tastes in music and even tulips, as the famous ‘tulip bubble’ example illustrates. As long as an economic or social factor faces variability, which basically every one does in a world of uncertainty, there is some

chance that speculation can begin. Whenever expected reward from risk exceeds expected risk, it is completely rational and likely beneficial for an agent to start or participate in a speculative 'bubble', attempting to get in early and to get out at or near the perceived peak. Rational Expectations Theory suggests that each agent will know that such an action is futile and hence not pursue it. This conclusion does not align with observed reality. If even one agent manages to start a speculative cycle, by testing, it is possible and rational for other agents to similarly test and jump on board as they may personally benefit overall. This dynamic has repeated itself over and over again in real estate, equities and other markets, as those that participate early profit at the expense of those who participate late, based on differing perceptions of when 'early' and 'late' may be. Rational Expectations does not explain observed outcomes in reality. Booms/Busts and more muted business cycles are each a fundamental and 'built-in' element of the market dynamic in Psychological Economics Theory. Considering that testing behaviour can easily generate crowd psychology/herd behaviour, speculation and 'bubbles' become very commonplace events in modern societies with rapid communication infrastructure. This conclusion is based on the same psychological drivers that make gambling a mainstay in our society, even with widespread knowledge that the odds are strictly managed for the profit of the gambling establishments.

Psychological Economics Theory explains the full range of market moves and provides a fully rational motivation for pure speculation, however it does not suggest that underlying drivers, such as profit growth, do not serve as some of the most important and consistent inputs to the determination of value. Speculative value can be extremely short-lived and is very often built upon a base of underlying non-speculative elements, such as strong corporate earnings, which is then imbued into direct ends goods/services or financial instruments. Statistical modelling of the oscillating trend and reversal dynamic can be achieved by considering that there are two forces at play, trend support and counter trend. It is possible to model the oscillating trend and reversal dynamic with a sum of two non-stationary ARMA models. The trend ARMA first builds and then weakens, while over the same period the counter trend ARMA first weakens and then builds. The fully endogenous nature of value and the principle of cumulative counter agent effects means that current value judgements will be heavily determined by observations of value from interactions in previous periods. This leads to an autoregressive element.

4.2. Psychological Outcomes

Joint Interaction - Negotiation

The previous discussion has focused very heavily on market interaction, because of all the social sciences, economics has established the broadest structured interaction model in the form of a market. This framework provides a strong foundation on which to establish a generalized analytical approach. As discussed, direct ends psychological interaction, which can be termed a negotiation, is a parallel notion to the direct ends economic market. Instead of arriving at a transaction with goods and/or services exchanged for payment at a solely monetary price, a negotiation arrives at an agreement, where commitments (which can include goods and/or services), terms, exchanges (which can include a financial price) and relationships are agreed upon.

Disjoint Interaction - Fad & Counter-fad

Market boom/bust and social fad/counter-fad trends are parallel phenomena, the former occurring in economic markets and the latter within broader societal interactions. Whether the social trend is a fashion fad, political viewpoint, or any other collective attitude such as a commitment to fight global warming, end poverty, go to war for the nation etc., the oscillating trend and reversal dynamic will often come into play, depending on the strength of the speculation. Speculation here is not limited to the financial market context, but rather encompasses a broader perspective wherein agents envision and pursue social outcomes that entail change, taking on risk in order to achieve those envisioned outcomes as the reward from risk. The parallel to a boom/bust market in this broader social context is a fad that gains momentum, peaks and then faces a backlash. The dynamic is the same. Political and cultural perspectives typically move in these broad strokes, where trends take the collective view in one direction and they 'boom' too far in that direction, only to generate a backlash in the other direction. Political views similarly ebb and flow over time.

5. Social Coordination & Social Coordination Failure

Non-optimal situations for societies can result when there exist longer-term indirect impacts of decisions on decision-making agents and when their actions impact others in society, either directly or indirectly. Such positive

and negative societal effects will be explored subsequently; not in the traditional context of exogenous externalities, but rather as aggregate impacts across populations of agents with endogenous drivers.

To this point we have focused extensively on Psychological Economics Theory within the context of its application to economic coordination between agents. Contemporary economic theory gives us very thorough analysis of the extent to which markets achieve efficient coordination and the extent to which they sometimes fail, bringing about market failure and subsequent problems such as moral hazard, free riding and externalities in general. Give and Take Decision Theory provides for convenient expansion of the well entrenched concepts of a market and market failure to a broader context that models social coordination and social coordination failure. Psychological Economics Theory explains economic, psychological, sociological and political decision-making and interaction between agents, both in the short-term and in the long-term. As discussed, the theory broadens the concept of market interaction into a model of interaction between agents in any social coordination context.

Theorem – Social Coordination Failure

Social coordination failure results whenever there is a decoupling of personal total cost from personal total benefit with respect to either directly dependent or indirectly dependent agents. The result is non-Pareto optimal allocations, where some agents bear a disproportionate amount of personal total cost and others obtain a disproportionate amount of personal total benefit. Overall utility levels aggregated across agents are reduced. Social coordination failure includes psychological/social, political and market failure.

The broad concept of social coordination failure is a generalization of economic market failure and as such it includes market failure as a subset. In contemporary economic theory market failure exists whenever the market is unable to deliver the most efficient, Pareto Optimal outcome across agents, in general due to externalities.

Psychological Economics Theory expands this perspective to define social coordination failure to exist whenever there is an aggregate decoupling of personal total cost from personal total benefit across a population of interacting agents. The result of this is non-Pareto Optimal allocations, where some agents bear a disproportionate amount of personal total cost and some obtain a disproportionate amount of personal total benefit. In market contexts, market failure occurs when the voluntary actions of agents fail to take into account broader indirect impacts, beyond the current transaction. This is a decoupling of personal total cost and personal total benefit over the long-term. In essence, Psychological Economics Theory abandons the concept that market failure is due to exogenous externalities in favour of the concept that it is due to endogenously generated gaps between personal total cost and personal total benefit across the population.

Whenever rewards and effort/cost are decoupled, allowing some agents to gain personal total benefit at the expense of other agents, through means other than a voluntary interaction/exchange (by avoiding some or all of the associated personal total cost), we see inefficient societal allocations result (moral hazard, free-riding, etc.). When considering the impact of policies or societal issues across populations it is important to remember that personal total cost and personal total benefit are fully subjective and may not always even be measurable in financial terms.

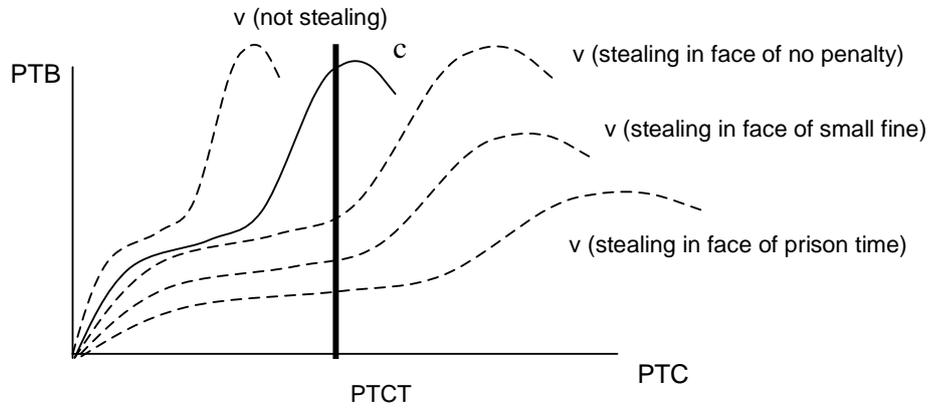
<p>Theorem – Personal Total Cost / Personal Total Benefit Coupling – “Accountability Economics” The Pareto Optimal utility outcome for society will occur when PTC and PTB are maximally coupled across all agents. This means every agent that obtains PTB bears the associated PTC, either through voluntary action and exchange or through proportionate allocation of total costs and total benefits (certain and uncertain) in the case of public services, including population-wide risk sharing/insurance programmes.</p>
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The PTB/PTC Coupling Theorem does not mean that PTC and PTB are equated at the transaction or aggregate level, as all agents have different interpretations that determine their values of PTB and PTC and since PTB in excess of PTC is required in order to provide an incentive for agents to act. Coupling of PTB and PTC means that agents and intermediaries are not able to obtain PTB at the involuntary disproportionate expense of others, taking into account preferences, usage and risk. Where involuntary allocations occur through taxation, public goods, public risk sharing programs etc., allocations of certain and uncertain PTB and PTC should be coupled across society. Psychological Economics Theory delivers a bold conclusion – that essentially every economic problem and every social coordination problem (defined as delivering non-Pareto Optimal outcomes) within societies can be traced back to a decoupling of personal total benefit and personal total cost across populations of agents, and that effective solutions can be uncovered by ensuring that coupling is achieved. Societal problems generally result when some agents are able to pursue their greed without accountability to society.

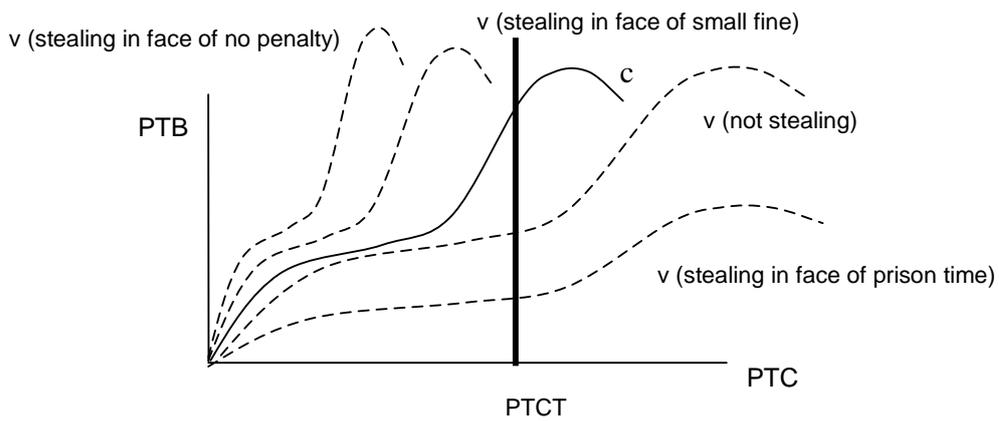
Figure 5 compares how individuals with differing perspectives will respond to scenarios that reflect various combinations of PTB and PTC.

Figure 5: Reactions to a Penalty in the Face of Potential Criminal 'Opportunity'

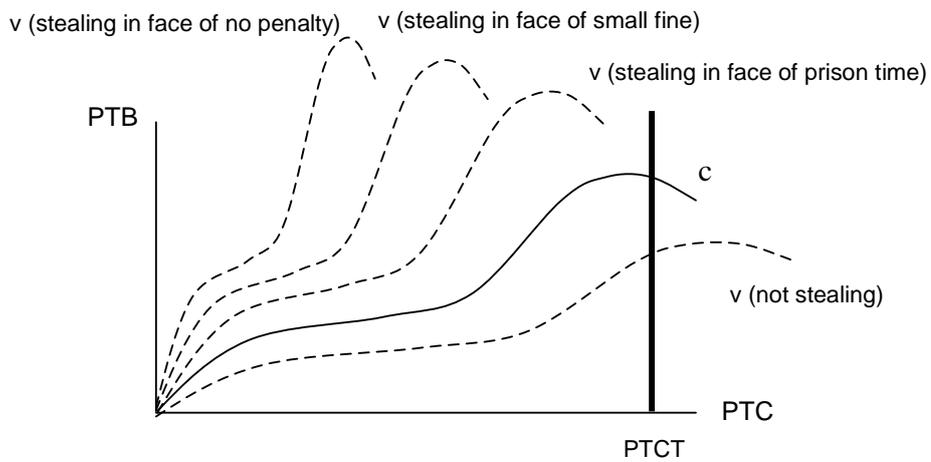
a. Perspective of Law Abider



b. Perspective of Petty Criminal



c. Perspective of Hard Criminal



As we would expect, this example demonstrates that the PTC of crime must be large enough relative to PTB to deter the hardened criminal, not the law abiding citizen. The PTC of crime can be as diverse as fines/incarceration in some societies or intense social scorn in others. These diagrams are shown a priori to a decision/action to steal or not to steal, and as a result, the schematics could differ significantly under various scenarios. For example, an agent's perspective will most often differ if they have recently been caught stealing or if they have experienced a long string of stealing successes without punishment.

As will be explored later, social coordination failure is typically the result of a build up in political and/or economic power, in the form of intermediaries. This recognition is of vital importance because it guides us in using the theory of Give and Take Economics to analyze and understand pressing societal problems. A number of societal issues, such as discriminatory biases, are not coordination type issues at their root, as they reflect the viewpoint of elements of society at large. However, even these issues are subject to the coordination dynamics of Psychological Economics Theory, as the prevalence of such views can spread through society in line with the oscillating trend and reversal dynamic of a fad/counter-fad cycle. There are 4 key levers that determine whether or not interactions will be fully coupled across society and when these criteria are met Pareto Optimal results will occur. These can be referred to as the 4 axioms of freedom:

The 4 Axioms of Freedom

1. Free (or at least low cost and equal) access to accurate, materially significant to the public at large political/economic/social information
2. Free (or at least low cost and equal) access to direct, active political/economic/social participation
3. Clear property rights: private rights accessible by free market exchange with reasonable public property access
4. Societal/economic (often politically legislated) penalties attached to breach of accountabilities (i.e. such as engaging in crime) and proportionate share of costs allocated through societal policies

When all of these criteria are met the conditions exist to allow a fully Pareto Optimal outcome across society, due to coupling of the levels of personal total benefit and personal total cost across members in society. As more of these criteria are obstructed and as the level of obstruction increases, often through intermediaries, outcomes will move further from Pareto Optimal.

5.1. Intermediaries

The recognized efficiency of the free market is a strong demonstration of the power of human coordination when personal total cost and personal total benefit are effectively coupled, because free market and free negotiation coordination is the purest mechanism to match personal total cost and personal total benefit across populations of agents, through direct voluntary interaction. When voluntarily interacting through trade, agents decide what personal total cost (usually a financial price to pay, combined with any ‘hassles’ of the buying experience) they are comfortable bearing in exchange for a desired personal total benefit. As a result, personal total cost and personal total benefit are coupled, *ceteris paribus*.

In order to expand this context to broader societal issues, beyond the direct parties involved in a transaction or negotiation, we must understand the concept of *reliance* (economic, political, and social) because it has a significant impact on the nature of coupled and decoupled PTB and PTC.

Theorem – Reliance

Social Reliance exists whenever an agent depends upon another, either out of necessity or out of choice, in achieving their own desired objectives. In a simple transaction or negotiation, reliance is typically limited to each party relying on the other to adhere to the understood terms of interaction. In generalized societal contexts, reliance most often takes on the form of intermediaries.

A very simple form of reliance is that of *employed agency*, whereby an economic/political agent hires or enlists another agent to represent them in some manner, such as in the capacity of a lawyer, accountant etc.. The economic motivation to employ intermediaries is strong, since it can allow an agent to focus on something that gives him/her higher personal total benefit (often via time savings) and lower personal total cost over time. Economists have thoroughly analyzed the concept of increased gains from trade through specialization and of intermediaries through the principle/agent problem. Analysis of the latter typically focuses on information asymmetry, but subsequent analysis in this writing will demonstrate that this is most often fundamentally a motivational asymmetry.

At a societal level, a common element of free economic and political systems is the reliance that agents typically place on others, allowing each individual to benefit from a more productive system based on leverage of differing skills, knowledge, specialization and individual interests. In complex modern economies, this inter-reliance shows itself in many specific forms. One is the simple employee/employer relationship. Another is in the specialization of labour. Yet another is in the specialization of a firm. A particular agent will generally specialize their labour and

production in one area, while another agent specializes in something else. As we know, this inter-reliance allows each agent to come out ahead due to the gains from specialization and trade. As an example, it is critical that a producer of hair cuts have faith that food producers will deliver on their end of the reliance and produce food in enough quantity to serve others that may wish to purchase it. Another such reliance is upon the acceptability of a medium of exchange, a common currency, and liquid assets close to currency. The assumptions of inter-reliance that individuals make about the way the entire 'system' will behave, through the aggregate actions of many individuals, distil into the concept of cumulative counter agent effects, as introduced and analyzed earlier.

Intermediaries are groups of individuals or groups of other intermediaries that come together in economic, political or general social systems and exert collective influence. An example of an intermediary is an organizing body of lawyers. Intermediaries are therefore distinguished from the systems they create and operate within, such as laws, policies etc.. All intermediaries share a common foundation. While meeting the needs of their end 'customers', intermediaries also strive to meet the needs of their member stakeholders and generally do so effectively by building collective power. When they are able to build collective power they generally become what is popularly known as a 'special interest' intermediary in the political and economic arena. Intermediaries reflect the aggregated motivations of their members, as well as the particular motives of their most influential members, such as their leadership.

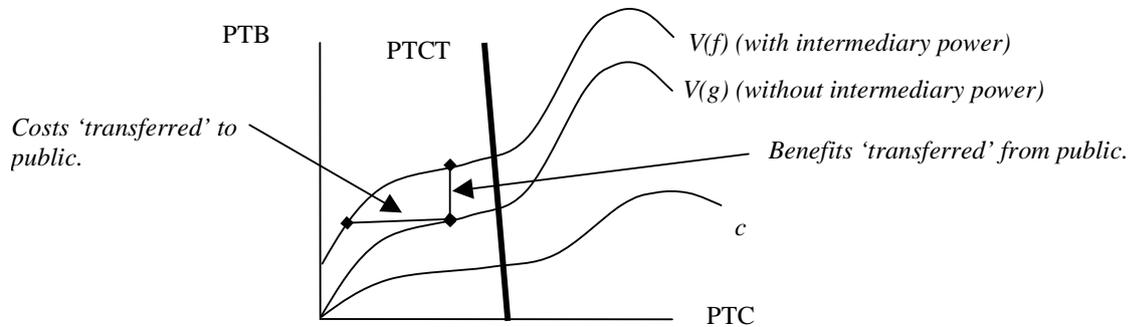
5.2. Impact of Intermediaries

In the short-term an intermediary will typically utilize its intermediary power to produce an increase in the utility of its membership, represented in Figure 6 via the increase from $V(g)$ to $V(f)$. The longer that this situation persists, the higher is the likelihood that c for the intermediary will itself increase to equal $V(f)$. This results as the intermediary comes to increase its expectations and expect its power and intermediary tax as the minimum acceptable situation.

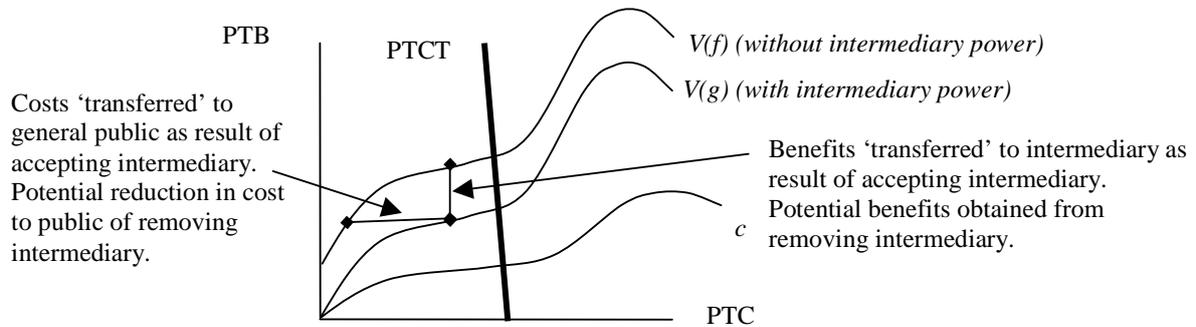
Figure 6 shows the impact of an intermediary.

Figure 6: Impact of Intermediaries

a. The Intermediary's Perspective— An 'Intermediary Tax'



b. The General Public Perspective



Many members of developed societies now see big government and big business as inevitable cumulative counter agent effects, the actions of which must be taken as almost fully given. Few citizens would currently view government as 'employed agents' upon which they can have significant impact without extraordinary cost and effort. As indicated previously, there is no inherent problem with 'big business' or 'big government' in itself other than the direct risk that this increased size results in a build up of power than can be abused. Being intermediaries, both groups are simply collections of individuals that will pursue the collective self-interest of their members, just as the individuals do on their own. Intermediaries are a natural economic and political force. They can be a benign one, bringing together people with a noble cause and giving it momentum. However, intermediaries become a barrier to Pareto Optimal outcomes when they obtain enough influence to 'take over' and run the system, perpetuating it, strengthening it, extracting an 'intermediary tax' and blocking 'outsiders' from access and meaningful participation. Once this happens it is very hard to reverse. There are many modern examples where this is the case, and many

observers would suggest that the politics of Western societies has become dominated by special interest lobbies (intermediaries) that invest tremendous time and money into influencing the professional politicians and bureaucrats (an intermediary) at a cost borne by the general public through the policies they influence.

The notion of intermediaries employed in Psychological Economics Theory and the associated concept of an Intermediary Tax are essentially generalizations of monopoly/oligopoly and monopoly/oligopoly 'rents' to the broadest economic and social perspectives. The principle of testing again comes into play here as almost all intermediaries test how powerful they can become and how much of an intermediary tax they can get away with. Within intermediaries, leaders also often test the extent to which they can inject their own personal interests along with those of the collective. These become interactions in their own right, which can in turn be analyzed within the machinery of Psychological Economics Theory. Testing means that the focus and power structure within intermediaries will often shift over time, either gradually, or by way of a more pronounced fad/counter-fad cycle.

The more comfortable citizens become as a result of economic success and basic political freedom, the less likely they are to want to 'rock the boat', even if they have to bear some certain ongoing PTC, including an intermediary tax, as a result of powerful intermediaries. Once a big government intermediary is established, the PTC of pushing for effective change against the 'big system' usually outweighs the PTB of effecting change for some time, until exploitation of power is taken too far. Also, as many individuals find that they can work in the private sector with great reward, they disengage from governmental intermediaries as much as possible, in favour of other personal pursuits. These factors contribute to still further growth of the intermediary's power. But, as Psychological Economics Theory models, there is a breaking point, represented for each individual by their personal total cost threshold (PTCT).

Key intermediaries such as government and large businesses are vital and their importance cannot be understated. There are always things like defence and legal systems that could never be fully in the hands of private capitalists, because profit as a sole objective will result in sub par results. In many cases consumers also want the stability and comfort of relying on the brands of large, powerful companies even if they have to bear extra PTC as well. Intermediaries with market/political power can serve a valuable purpose, and to the degree that agents across the

population value this market power as adding personal total benefit that exceeds incremental personal total cost, the intermediaries can exist as part of a Pareto Optimal outcome.

The consideration of which intermediaries can efficiently deliver a Pareto Optimal outcome within society doesn't come down to the consideration of whether there is greater productivity in government, business or even in the size of the intermediary, as is typically thought. The consideration instead comes down to the breadth of the active direct participation (individuals personally bearing PTB and PTC) of members of the general population within the system. To the extent that political, economic or social systems foster direct, active and engaged participation of the full population of society, they facilitate the direct interests of that society. With one hundred percent active public participation the pure concepts of democracy and capitalism work together. Within this extreme scenario there are no intermediary taxes or professional politicians, but there are systems, rules and guidelines established through the interaction of a broad swath of individuals that are not professional politicians. A direct participation political and economic model is the only type that can truly resist the build up of institutionalized market and political powers (i.e. special interest elite groups with entrenched power obtained through the system they run) that builds in inefficiency and a reduction of freedoms.

In reality, since there is a large cost of direct participation in government for many individuals, in the form of opportunity costs, there will always be some level of professional politicians and bureaucrats. One would expect this level to be that which equates the marginal cost of direct participation with the marginal cost of the 'intermediary tax' extracted from the public by the professional politicians, interest groups and bureaucrats. In other words, productive citizens will tolerate professional politicians and bureaucrats rewarding themselves personally on the taxpayer's dime through pensions, perks etc., up until the point that the cost of these extracted advantages reaches the cost of their direct involvement as citizens. Once the cost of the intermediary tax exceeds the cost of personal direct involvement, citizens will get involved in government to bring the costs back down. Overall, the PTB versus PTC trade-off of agents will determine how big they will let intermediaries get.

To the extent that the systems of justice, commerce etc., are left to the direction of professional politicians and professional management disconnected from equity incentive, intermediaries, whether formally or informally

organized, will develop with their own collective interests, putting a wedge between the direct interests of the populace. Whenever a democratic government with professional politicians exists, politics will eventually become a choice between a small group of large and powerful 'centrist' governments that collectively form an intermediary. There will also always be dominant powers in business, built up through successful competition. This reality can't and shouldn't be abolished, but a population can and should uphold a system that allows full political and economic competitive opportunity. It makes sense for agents to 'outsource' bureaucracy, but not decision-making and policy.

5.3. Optimal Political, Economic and Social Systems & Policy

Psychological Economics Theory provides guidance in understanding the optimal forms of government and commerce. Capitalism without fair rules of engagement that are consistently enforced and obligations to society leads to the creation of powerful exploitive oligopolies, periodically disrupted by major innovations and power shifts. Capitalism is an economic system based on periodic competitive upheaval, and as such, a core safety net of social insurance needs to be in place to protect those agents that experience severe fallout from capitalistic upheaval, in order to uphold a credible belief in the system and maintain social stability. By contrast, complete socialism or communism results in a stagnant economy where everyone is expecting to take out of the system without putting in the PTC required to provide growth.

Freely competitive markets and direct democratic political participation are the approaches that together deliver Pareto Optimal results for society. However, free markets and direct participatory democracy are simply efficient coordination systems in delivering Pareto Optimal results. They do not ensure in any way that the wants, needs and beliefs of society are appropriate in some moral sense. They simply make the most people happy to the highest possible degree given their preferences, and they can only do so to the extent that broad intermediaries don't exert exploitative power. This is the most that any coordination system, whether economic, political or social, can achieve. Society will only ever rise to the standards set by its leaders and its people overall. Coordination systems cannot correct for apathetic populations that do not wish to be actively engaged, a situation that often arises in highly successful political economies of 'comfortable' citizens, evidenced by low voter turnout. Nor do they correct for an agent's own perceptions of PTC and PTB that may in fact be non-optimal for their own utility - a situation which is very common when individuals consider the short-run and not the long-run. Consider the example wherein

an agent places higher priority on the flavour and experience of smoking a cigarette than the long-term benefit of good health.

A disengaged, apathetic population will inadvertently create conditions that negatively impact their own utility at large, by allowing the build up of a large intermediary government. Unlike production of goods and services, which can be divided up amongst members of society to leverage gains from specialization, there are no corresponding efficiency gains from having one group specialize in governing the rest. Conventional views often hold that a government intermediary of significant size, with many professional politicians and bureaucrats, is not necessarily a risk, as long as there exists the democratic option for the people to replace undesired politicians through a vote. This is not necessarily the case however, because in practice there typically exist a small number of major political parties that even though competing for votes, also cooperate as part of one intermediary (professional politicians) with a directly vested interest in upholding policies that secure the PTB of all those within the community of professional politicians. As a result, the public gets to choose from a small number of relatively centrist options, which may have very different policies, but that together bestow additional benefits upon all professional politicians and bureaucrats.

Even with direct democratic participation and capitalist systems in place to foster and encourage participation and engagement, only the spirit of the population truly determines how good their government, business and social leaders will be. If the population doesn't demand excellence and invest in achieving it, they simply won't get it. This conclusion is borne out by the fundamental PTB versus PTC trade-off of Psychological Economics Theory. In today's populous, complex and fast moving societies it seems very unlikely that any significant element of the public could directly participate in political decision-making. Direct, active participation seems impractical in reality, but this is where creative structural solutions need to be explored. For example, it is conceivable that our political system might allow citizens to take a leave of absence from employment with some base compensation from government funds in order to fully participate in decision-making and policy implementation for a fixed period of time on a number of issues. This would allow individuals to fully educate themselves on issues at hand, share views with the public, vote on them directly and then actively drive their implementation. This approach could also potentially reduce overall costs since it replaces both professional politicians and professional bureaucrats with active participant citizens that tax and spend on a policy-by-policy basis.

Key to such an approach is that citizens do not continuously serve and that the vote not be limited to this core participating group, otherwise this group will in effect just become professional politicians and bureaucrats. In such a system each citizen would participate in a manner which reflects their personal biases, both individual and those of any intermediaries to which they belong. This allows healthy competition and collaboration across all vested interests within society and also ensures that there is no overriding professional politician intermediary subject to the ongoing concentrated influence of special interest intermediaries. Special interest intermediaries will no doubt still use their power to influence, but rather than influencing a small group of professional politicians, they must influence society at large.

It is somewhat surprising that modern, free societies believe that freedom of speech must be extended to all without cost but seem not to take as seriously the freedom of active and direct participation in government without personal cost, which is just as important. It seems difficult to imagine the developed economies of the world utilizing a system of *full freedom with accountability* that fully couples PTB and PTC across all agents based on the operation of 1) fully free markets, 2) fully active direct democracy, 3) clear property rights and 4) proportionate share of societal costs, including penalties for breach of accountabilities – absent of large manipulating intermediaries (both public and private) – a system we might refer to as a *FreeAccountable* society/economy. But, perhaps this is a ‘hump’ to get over, in the same manner that it was once hard to imagine many European Feudal Monarchies becoming democratic capitalist economies.

Theorem – The *FreeAccountable* Society/Economy

Long-term Pareto Optimality in economies/societies occurs when full freedom with accountability is achieved, when the conditions for a *FreeAccountable* Society/Economy are met, which maximize coupling of PTB & PTC across all agents:

- 1) Fully free markets
- 2) Fully active direct democracy
- 3) Clear private and public-share property rights
- 4) Political/economic (often legislated) penalties attached to breach of accountabilities (i.e. such as engaging in crime) and proportionate share of societal costs allocated through policies

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