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The Temporal Structure of Specialization and Economic Change – [IN WORK]

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Abstract

This paper interprets the division of labor through the temporal lens of the market process: specialization fundamentally reorganizes time allocation between necessity and discretion, not merely output per unit of time.

Productivity gains manifest through three sequential effects - income, diversification, and displacement. As markets mature and diversification exhausts, displacement dominates: organizational improvements reduce the time required per unit of output, liberating discretionary time. The relation $T_S + T_C \equiv O(S)$ formalizes how discretionary time (T_C) and Time for necessities (T_S) and organization of specialization are two sides of the same coin, with $T_C = T_S \times M$ where M is the multiplying effect of cooperation and exchange.

Freed discretionary time enables Productivity-Yielding Demand: wants requiring discretionary time as input that cannot be known ex ante because they depend on temporal conditions not yet realized. This represents genuine ignorance about future possibilities. Alert entrepreneurs discover profit opportunities in discretionary time, driving further specialization that increases M and liberates more time—an autocatalytic process of spontaneous order.

The mechanism reveals why the market process cannot equilibrate. Coordination success alters the temporal structure of action, enabling previously impossible wants. Entrepreneurial responses disrupt existing coordination patterns. Economic change is endogenous: specialization creates discretionary time, which enables unforeseen demand, which drives further specialization. The very process of coordinating involves discoordination.

Note: This is a working paper version (IN WORK). The current draft focuses on the primary theoretical derivation of the Kairosian identity and Productivity-Yielding Demand. Future revisions will include expanded literature synthesis regarding modern time-allocation studies and evolutionary growth models.

Keywords: Time Allocation, Division of Labor, Spontaneous Order, Endogenous Growth, Austrian Economics

JEL: O10, J22, D23, O40, B53, D83

1. Enduring Economic Change

This paper develops a temporal analysis of the division of labor in the market process. It argues that specialization is a source of endogenous disequilibrium. This conceptual framework builds upon and extends the initial 'Kairosian' perspective developed in von Haslingen (2000), moving

¹ The paper is a consolidation and further development of the core idea presented as a B.Sc. Thesis at the University of Linköping, Sweden in March 2000 by the author.

from a focus on dissipative structures toward an endogenous theory of discretionary time and market discovery.

It is argued that division of labor operates through time allocation, not merely output expansion. Specialization reduces the time required for survival, creating discretionary time that did not previously exist for expressing demand. This temporal liberation enables unforeseen wants to emerge, driving entrepreneurial discovery and further structural change. Coordination success thus generates its own disruption. As noted in von Haslingen (2000), the market acts as a dissipative structure where the 'order' of specialization (S) does not lead to a static equilibrium but rather to a continuous flux of liberated time.

The argument proceeds in four steps: establishing time as ultimate scarcity, interpreting division of labor through a temporal lens, formalizing the relationship between temporal structure and economic organization, and demonstrating how productivity gains generate perpetual change through what we term Productivity-Yielding Demand.

2. Acting to Circumvent Scarcity

This framework begins with taking the finite fact of life as a fundamental. From this emerges the ultimate scarcity – life time itself. Other resources appear scarce not because of intrinsic unavailability, but because acquiring them requires time. Nature knows no scarcity; only organisms aware of finitude experience scarcity.

For humans, time is not merely one resource among many - it is the resource through which all others are measured. An hour spent obtaining food is an hour unavailable elsewhere, that is the opportunity cost of obtaining food. This temporal constraint defines the economic problem.

That Man is not indifferent between life and death is taken as an axiom. From this follows teleologically: the intelligent and aware man will purposefully organize action toward enjoyment of life. Through work and productivity - the application of knowledge and effort - man can increase freely disposable time by reducing the time required for survival necessity. This is not passive allocation but proactive organization: the human quest to circumvent temporal scarcity itself.

Our interest is how this quest manifests in economic organization. Through learned dexterity, cooperation, and institutionalization, humans collectively reduce the time-cost of survival. This accumulated knowledge is expressed in how productive work is organized - what is termed the Organisation of Specialisation. The structure emerges through spontaneous order (O'Driscoll, 1977, Hayek, 1978), subject to creative destruction (Schumpeter, 1942): organizational forms that successfully reduce the time-cost of survival proliferate; those that fail are selected against. The presumption here is that man's action is the proactive initiative to circumvent scarcity under the best use of dispersed knowledge - to reclaim life from the void of necessity.

We do not measure progress in terms of Chronos—objective clock-time productivity and output. We label our framework Kairosian because we focus on the lived-time experience of human liberation from necessity. The metric of progress is not only output-per-hour, but the ratio of time-consumed-by-necessity (T_s) to time-freely-disposable (T_c), formally stating the quest to:

$$\min \frac{T_s}{T_c}$$

This perspective evaluates economic organization by whether it serves the fundamental human quest to reclaim time from the void of necessity. Our analytical task is to understand the dynamics of the time-liberation process.

3. The Temporal Aspect of Division of Labor in the Market Process

To understand the origins of economic change, our analysis must begin with the classical source of economic progress: the division of labor. The insights of Adam Smith (1776) remain the bedrock for understanding how societies generate development and wealth, however the latter is defined.

Smith identified three principal consequences that arise from the division of labor and specialization of work, which collectively explain productivity²:

First, the "increase in dexterity in every workman" - the process of learning-by-doing, where focused repetition of a specific task leads to mastery and greater efficiency.

Second, the "saving of the time which is commonly lost in passing from one species of work to another" - by eliminating the need to switch tasks, tools, and mental states, specialization removes a significant source of friction and inefficiency from the production process.

Third, the "invention of a great number of machines which facilitate and abridge labor" - when an individual's attention is devoted to a single object, they are more likely to "discover easier and readier methods of attaining" their goal. This focused attention is the wellspring of technological and process innovation.

Synthesizing these three mechanisms reveals their unifying consequence: division of labor through specialization fundamentally increases productivity, meaning that more output can be produced within a given time input, or, equivalently, that a given output can be produced with less time input. We adopt a temporal view of Adam Smith's insight to analyze how these productivity effects unfold within the spontaneous order of the market process (Hayek, 1937, 1948, Kirzner, 1973).

However, this analysis cannot treat the firm merely as a node within the market. Analytically, it is necessary to distinguish between the division of labor within firms and the division of labor between firms. The two operate under fundamentally different coordination principles and give rise to distinct temporal consequences.

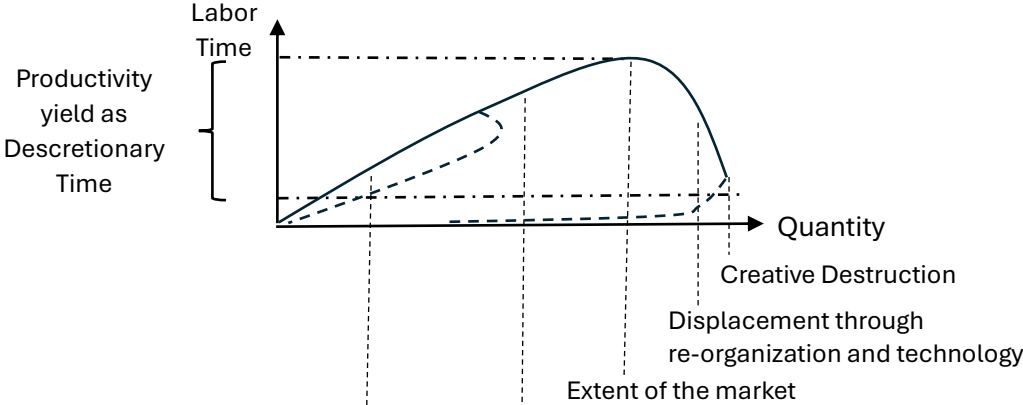
Division of labor within the firm is organized through planned coordination and hierarchical direction. Its function is to absorb productivity gains by deepening specialization, stabilizing routines, and redeploying labor within a coherent organizational structure under convergent expectations. By contrast, division of labor between firms is governed by market coordination, competition, and entrepreneurial discovery. Phenomena such as creative destruction arise only at this inter-firm level, where organizational success in one firm manifests as consequences and restructuring in others.

In this setting the path dependent trajectory of successful production of supply oscillates between further three effects in the temporal view of division of labor. First, an *income effect*,

² Following Yang (1993) "The division of labor is based on specialization, but differs from specialization. There is no division of labor if all individuals are specialized in the same activity. The division of labor is an organizational structure where individuals are specialized in different activities. Hence, specialization and diversity between different professions are two aspects of the division of labor".

whereby the same supply is provided at lower cost, irrespective of how the resulting surplus is distributed among the stakeholders³. Second, a *displacement effect*, whereby labor is substituted by technology or more efficient organization. Third, a *diversification effect*, whereby existing productive capabilities are applied to additional purposes and use-cases. At this stage, the specific organizational form is secondary; what matters is that productivity gains can still be absorbed in the path dependent setting through functional differentiation, that is adjusting the function of the product to the needs of adjacent markets and developing those markets, thereby temporarily maintaining labor time.

This process progresses until the division of labor reaches the extent of *that* market - that is, the limit of specialization within a functionally defined domain. The division of labor is bounded within each such market. Once this boundary is reached, self-organization ceases to generate further specialization in the sense of task differentiation⁴. Competitive cost pressure, however, does not cease. When diversification within the market is exhausted in terms of product saturation, productivity gains can no longer manifest through further division of labor. Once diversification within the market is exhausted, productivity gains manifest predominantly through displacement. Productivity efforts continue, but now predominantly as a reduction in the labor time required per unit of output, that is continuously organizing work efficiently and replacing labor with technology. In saturated markets we see a high degree of optimization efforts, consolidation tendencies and high deployment of technology and finally, dependent on creativity the complete replacement of certain a supply function and a complete displacement of labor time⁵. Figure 1. captures the temporal process of division of labor in a descriptive manner in terms of labor time input and supply quantity output over the stages, where the effects play out.



³ The corresponding cost effect is due to scale economics and less labor cost and the beneficiaries of the income effect obviously include the business participants: the business owner, the suppliers and the customer negotiating the zone of possible agreements, the labor supplier normally under a fixed contract, institutions under the social contract as tax, (any other?)

⁴ We take the “extent of the market” to have a certain inherent elasticity and not to be clear cut, but as a situation in which entrepreneurs and managers get signals for alternative action.

⁵ In modern terms optimization efforts is known and popular as Lean Thinking (e.g. Womack & Jones, 1996). Also we today see technological deployment to the extent of “black factories”, indicating no human deployment in the manufacturing process, or so called “vibe coding tools” (e.g. Cursor, Augment Code or Blitzy), where artificial intelligence (AI) agents replace the software engineer as a whole category of an occupation or for some functional supply AI substitute the function in total. Creative destruction however does not logically follow from division of labor and can disrupt the functional supply wherever in the process, likewise a supply function might never be subject to creative destruction, the wheel, since it was founded some 4.000 years B.C. has not been fundamentally substituted like the writing machine was substituted by the pc word processing.

Figure 1. The temporal process of division of labor

A static view of productivity, comparing ex ante and ex post quantity output only, is an incomplete analysis of the productivity outcome.

The difference between the time required ex ante and the time required ex post to provide a given supply constitutes a yield that initially presents itself as a choice between time and quantity. Productivity gains are predominantly claimed as increased output. The temporal view however, acknowledges a concomitant yield of time savings released as discretionary time. Once the extent of *those* markets is reached, competition no longer permits specialization through diversification, but it continues to enforce specialization through displacement, yielding discretionary time gains alongside output. What begins as a choice between time or means output thus in the temporal view resolves into a joint accumulation of both. This further means we have two phenomenological and analytical levels adhering to the dichotomy of utility and finite fact of life, with increased means in the former realm and increased discretionary time in the latter, reinforcing each other.

We expand this observation of the temporal view of division of labor in firms contingent on division of labor and competition between firms and the spontaneous order of the market process to be the mediator for generating aggregated discretionary time.

The concept of "time saving" is therefore not merely a metric of efficiency. It is the fundamental link connecting the organization of production to the dynamic evolution of the entire economic system. Each increment in specialization reduces the time cost of survival, creating a residual in principle of freely disposable time that, as we argue, becomes the wellspring of change.

4. The Time Structure and Organisation of Specialisation

Having established that division of labor fundamentally generates freed-up time, we now formalize the relationship between time allocation and economic organization as the synthesized framework. This requires distinguishing between two essential categories of time use and understanding how they relate to the observable structure of the economy: we distinguish in terms of the activity done during this elapse of time, hence between the activities Time Saving (Ts) and Time Consumption (Tc):

Time Saving (Ts) represents time spent in productive engagement - the time devoted to activities necessary for survival and sustenance. This includes not only formal work but also the utilization of any service or artifact that accomplishes tasks aimed at maintaining life. From engaging in productive work to using a washing machine or hiring a delivery service, Ts encompasses all activities undertaken to prolong free life, whether in work or leisure contexts, hence also acknowledging the consumer-producer.

Time Consumption (Tc) represents discretionary time - the period of free disposal created by productivity gains. This is the time during which individuals are free to express new, often unforeseen, wants and to engage with whatever the idiosyncratic mind fancies. It is not "free" time as a gift of nature, but time that has been economically produced through the efficiency of the organization of the specialized system.

These two components form the fundamental time structure of human life⁶:

$$l = t_s + t_c, \text{ where } t_s + t_c = 1$$

where l represents the finite lifetime (whether conceived as a day, a year, or an entire life)⁷. We take as given that discretionary time t_c is of higher value than necessary time t_s , because during t_c the individual can express and pursue whatever purposes they choose, constrained only by their means. It is the division of labor and productivity that enables devotion to this higher-valued time. Aggregated over the economy, we consider an average lifetime L and corresponding average T_s as time saving activities and T_c as the average discretionary time, such that

$$L = T_s + T_c, \text{ where } T_s + T_c = 1$$

Organisation of Specialisation

The economic process can be understood as a decentralized, continuous quest to minimize the ratio t_s/t_c , hence T_s/T_c - that is, to maximize the amount of freely disposable time available to individuals. This relentless pursuit of productivity serves as the primary engine of economic evolution.

The overall Organisation of Specialisation, denoted $O(S)$, is the observable, self-organized structure of the economy that emerges from this dynamic market process of organizing the division of labor and specialization. Cooperation and exchange - requiring at minimum two individuals - constitute the foundation of this structure. We define $O(s)$ as comprising three essential components:

- **T_T (Productive Capacity):** The time released by the stock of productive knowledge and capital - including physical tools and machines, codified techniques and procedures and accumulated technical knowledge. This represents the "what" of amplification: what makes a unit of labor time more productive.
- **T_{IP} (Primary Coordinating Institutions):** The time released by coordinating productive capacity efficiently through the business Firms, i.e. institutions that organize specialized labor and deploy productive knowledge. This includes not only the formal structures of firms but also the tacit organizational knowledge, routines, and capabilities through which firms actually coordinate production. This represents the "how" of amplification: how productive capacity is actually organized and applied through cooperation and exchange.
- **T_{IS} (Secondary Institutions):** The time released by fundamental institutions that enable coordination to function between economic actors - language, time-keeping systems, property rights, contracts, medium of exchange (money), law, and cultural norms of trust and reciprocity. This represents the "context" that makes coordination possible.

These factors are complementary. Without productive capacity, institutional sophistication cannot generate productivity. Without coordinating institutions, productive capacity cannot be

⁶ We use the mathematical language here for pedagogic reasons, not necessarily here with the purpose of a coherent deductive reasoning.

⁷ l represents functional lifetime—the period during which conscious action is possible. The framework distinguishes between time consumed by productive necessity (t_s) and time freed from necessity (t_c), but does not measure quality (Involuntary suffering—such as illness, disability, or grief) of experience within t_c .

efficiently deployed. Without fundamental rules and norms, neither productive capacity nor coordination can function at scale.

The Kairosian Identity

We propose a central organization relationship of this framework. The time structure of human life and the organizational structure of the economy are not merely correlated - they are identical at the aggregate level, such that:

$$T_S + T_C \equiv O(S)$$

The time structure of human life and the organizational structure of production are not two separate phenomena that happen to coincide - they are one phenomenon viewed from two perspectives fundamentally interrelated⁸.

The organizational structure $O(s)$ determines the temporal possibilities available to individuals. A society with more efficient organization (higher $T_T \times T_{IP} \times T_{IS}$) enables individuals to maintain their living standard with less necessary time (lower T_S), freeing more discretionary time (higher T_C). Conversely, how individuals allocate their time between necessity and discretion both reflects and reinforces the organizational structures that emerge through cooperation and exchange.

The identity operates at the aggregate level, acknowledging variations on individual level. It captures a fundamental constraint: the time structure of society cannot change without corresponding changes in how production is organized, and vice versa. They are two descriptions of the same underlying reality.

Formalizing the Relationship

The organizational structure acts as a multiplier on productive time, amplifying its effectiveness:

$$O(S) = T_S * T_T * T_{IP} * T_{IS},$$

substituting $O(S)$, we have the time structure identical to the multiplier on productive time:

$$T_S + T_C \equiv T_S * T_T * T_{IP} * T_{IS},$$

rearranging this identity and factoring out T_S reveals the fundamental time-liberation relationship:

$$T_C \equiv T_S(T_T * T_{IP} * T_{IS} - 1),$$

which encapsulates the mechanism at the heart of economic evolution. Substituting $(T_T \times T_{IP} \times T_{IS} - 1)$ for M as the productive multiplier we get:

$$T_C \equiv T_S * M,$$

⁸ We do not measure progress in terms of Chronos—objective clock-time productivity and output. We label our framework Kairosian because we focus on the lived-time experience of human liberation from necessity. Kairos, the God of opportunity, is the time not of measurement but of human activity, concerned with the time of movement, with change, with the emergence of the new and with active innovation (Jaques, 1982).

This relationship shows that discretionary time is proportional to both the productive time devoted (T_S) and the net productivity gain (M) from organizational efficiency⁹.

From the time constraint $T_S + T_C = 1$ and the relationship $T_C = T_S * M$, we can derive:

$$T_S + T_S * M = 1$$

$$T_S(1 + M) = 1$$

therefore:

$$T_S = \frac{1}{1 + M} = \frac{1}{T_T \times T_{IP} \times T_{IS}}$$

and:

$$T_C = \frac{M}{1 + M} = \frac{T_T \times T_{IP} \times T_{IS} - 1}{T_T \times T_{IP} \times T_{IS}}$$

We interpret as follows:

First, discretionary time exists if and only if $M > 0$, which requires $T_T \times T_{IP} \times T_{IS} > 1$. The organizational structure must provide more output per unit of productive time than the time invested. When $T_T \times T_{IP} \times T_{IS} = 1$, the multiplier $M = 0$ and all time is consumed by necessity - organization provides no net gain, whether due to primitive technology, inefficient coordination, or absorptive institutional complexity. When $T_T \times T_{IP} \times T_{IS} < 1$, we have $M < 0$ - organization actively destroys productivity, creating time poverty where survival becomes impossible even with full-time effort. Economic progress requires developing productive capacity, coordinating institutions, and foundational rules that push the organizational multiplier substantially above unity.

Second, time liberation is proportional to both productive effort (T_S) and organizational efficiency (M). The same hours of work yield radically different amounts of freed time depending on how efficiently production is organized through cooperation and specialization. As the organizational structure becomes more efficient ($T_T \times T_{IP} \times T_{IS}$ increases), T_S decreases and T_C increases proportionally.

Third, there are two paths to altering T_C : increasing M (more efficient organization) or changing T_S (working more or fewer hours). However, T_S and M are interdependent through the constraint $T_S = 1/(1 + M)$. Therefore, sustainable time liberation requires increasing M - making organization more efficient - which automatically reduces the T_S required for a given standard of living and increases T_C .

Fourth, the multiplier can fall below zero. When organizational complexity increases transaction costs faster than productive capacity increases output - when $T_T \times T_{IP} \times T_{IS} < 1$ - we have $M < 0$, resulting in negative discretionary time. This is an impossible condition that manifests as time

⁹ The relationship $T_S + T_C \equiv O(S)$ formalizes the temporal trade-off inherent in any social organization. While the algebraic form was first proposed in von Haslingen (2000) to describe the conversion of necessity-time into free-time, the current paper extends this into the multiplier effect $T_C = T_S \times M$.

poverty, where even full-time productive effort cannot secure survival, leading to social breakdown or institutional collapse.

This framework thus integrates the productive structure of the economy with the temporal structure of human life, establishing a direct link between how we organize production through cooperation and exchange and the opportunities this organization creates for freely disposable life.

5. Productivity and the Generation of Unforeseen Demand

From Productivity Gains to Time Liberation

The organizational structure $O(S) = T_T \times T_{IP} \times T_{IS}$ determines the economy's aggregate productivity, captured by the multiplier $M = T_T \times T_{IP} \times T_{IS} - 1$. As established in Section 4, this relationship yields $T_S = 1/(1 + M)$ and $T_C = M/(1 + M)$.

At the level of cooperation and exchange of firm acting in markets, Section 3 described how productivity gains manifest through three effects: income (lower costs), diversification (application to adjacent markets), and displacement (reduced labor time per unit output). While all three effects operate continuously, their relative importance shifts as markets mature. In developing markets, diversification absorbs productivity gains through expanding variety and new use-cases. In saturated markets, displacement dominates as further differentiation becomes exhausted and productivity improvements manifest primarily as reduced labor requirements.

This displacement dynamic—operating across many markets at various stages of maturity—is what drives the aggregate relationship between M and T_S . As the organizational structure becomes more efficient (M increases), the total productive time required to maintain a given standard of living decreases (T_S decreases), necessarily freeing discretionary time (T_C increases).

This freed time does not vanish into idleness. It represents a fundamental alteration in the human condition: time that was previously consumed by necessity is now available for other purposes.

Productivity-Yielding Demand

We term the wants that emerge from discretionary time Productivity-Yielding Demand (PYD) to distinguish it from necessity-driven demand. Understanding PYD requires recognizing that it differs from demand in three conventional senses:

First, PYD is not demand for survival necessities. Food, shelter, and basic sustenance generate relatively predictable demand constrained by biological requirements. While innovation occurs in how these needs are met, the needs themselves are largely stable.

Second, PYD is not merely the income effect of productivity gains. When productivity increases, individuals may have higher real incomes, allowing them to purchase more of existing goods. But PYD represents something categorically different: demand for goods, services, and experiences that require discretionary time as an input for their consumption or enjoyment.

Third, PYD is not simply a shift in preferences over existing goods. It represents the emergence of entirely new categories of wants that were previously unexpressed - not because individuals lacked desire, but because they lacked the temporal means to realize those desires.

Consider: streaming entertainment, recreational travel, elaborate hobbies, fitness regimens, continuing education, social media engagement, gaming, meditation retreats, culinary

experiences. These are not merely different ways to satisfy pre-existing wants. They are wants whose very expression requires discretionary time. A person working fourteen hours daily for subsistence cannot want a yoga class in any meaningful sense—not because yoga is unknown, but because the temporal condition for wanting it does not exist.

Why PYD is Fundamentally Unforeseen

PYD is not merely uncertain in the Knightian sense (probabilistically unknowable) or dispersed in the Hayekian sense (known by someone, somewhere, but not coordinated). It is genuinely unforeseen in a stronger sense: the wants that emerge from discretionary time cannot be known *ex ante* because they depend on temporal conditions that do not yet exist.

This is the "sheer ignorance" that O'Driscoll and Rizzo identify: ignorance not about existing facts but about future possibilities that depend on changes in the means structure of action. When productivity liberates time, it does not merely reveal opportunities that were always there. It creates new opportunities by altering what is temporally feasible.

In 1800, no one could meaningfully want "weekend recreational hiking" because discretionary weekends did not exist for most people. The want was not hidden or suppressed—it was structurally impossible given the temporal constraints of that era. When productivity gains created the two-day weekend in the early 20th century, entirely new categories of demand emerged: weekend entertainment, recreational equipment, travel services, leisure activities. These wants could not have been predicted in 1800 because they required a temporal condition—the weekend—that did not yet exist.

Similarly, in 1950, no entrepreneur could have predicted the demand for smartphone applications, not merely because the technology didn't exist, but because the temporal pattern of modern life—constant connectivity, micro-moments of discretionary time throughout the day—had not yet emerged. The productivity gains that created these temporal patterns simultaneously created the possibility space for entirely new categories of demand.

This is why PYD is endogenously unforeseen: each increment of time liberation creates temporal conditions that make new wants expressible, but those wants cannot be anticipated before the temporal conditions exist. We face genuine ignorance about what people will want when they have more discretionary time because those people do not yet know themselves—the temporal means for expressing those wants are not yet available.

The Entrepreneurial Response and Further Specialization

Alert entrepreneurs perceive profit opportunities in freed discretionary time. When productivity gains create T_C , entrepreneurs experiment with offerings designed to fill that time: new goods, services, experiences, and organizational forms. Most experiments fail, but successful ones demonstrate viable ways to deploy productive capacity toward meeting unforeseen wants.

This entrepreneurial response drives further specialization through two channels:

First, direct specialization: Meeting new demands often requires new techniques, knowledge, and organizational arrangements. The tourism industry, entertainment sector, fitness industry, and experience economy are all specialized responses to discretionary time. Each represents a deepening of the division of labor into domains that were marginal or nonexistent when T_C was smaller.

Second, induced productivity improvement: Competition among entrepreneurs to capture discretionary time drives innovation that increases the productivity multiplier M . New technologies (T_T) emerge—cameras for tourism, streaming platforms for entertainment. New organizational forms (T_{IP}) develop—travel agencies, fitness franchises, content creation studios. Occasionally, even institutional arrangements (T_{IS}) evolve to facilitate coordination in these new domains.

These productivity improvements further increase M , which further reduces T_S (for a given standard of living), which further increases T_C , which enables new categories of PYD to emerge, that is the mechanism is autocatalytic.

The Autocatalytic Loop

The complete mechanism operates as follows:

[Productivity \uparrow] \rightarrow [M increases] \rightarrow [T_S decreases] \rightarrow [T_C increases] \rightarrow [New PYD emerges] \rightarrow [Entrepreneurial discovery] \rightarrow [Further specialization] \rightarrow [Productivity \uparrow]

Each stage creates the conditions for the next:

- a. Productivity gains increase M , reducing time required for survival and creating discretionary time
- b. Discretionary time enables unforeseen wants to emerge—wants that require time as an input
- c. Unforeseen wants create profit opportunities that alert entrepreneurs discover
- d. Entrepreneurial discovery leads to experimentation with new offerings
- e. Successful offerings require and drive further specialization
- f. Further specialization increases productivity through the mechanisms Smith identified
- g. Increased productivity liberates more time, beginning the cycle anew

Crucially, this mechanism is endogenous. It does not depend on external shocks—technological breakthroughs imposed from outside, demographic changes, natural disasters, policy shifts. While such shocks certainly matter and interact with this process, the PYD mechanism operates continuously through the normal functioning of the market process. Specialization itself generates the change.

Why Coordination Success Generates Discoordination

This mechanism reveals why the market process cannot settle into equilibrium. Successful coordination - organizing production efficiently to reduce T_S - necessarily alters the temporal structure of human life by creating T_C . This altered temporal structure changes the means available for action, enabling wants that were previously impossible to express.

When entrepreneurs respond to these unforeseen wants, they disrupt existing coordination. Established production plans become obsolete. Labor must re-allocate. Capital must be redeployed. New organizational forms emerge while others decline. The very success of coordination in one period creates the conditions for discoordination in the next.

This is not disequilibrium caused by information gaps or coordination failures—it is disequilibrium generated by coordination success. As Rizzo observed, "The very process of coordinating must involve discoordination." Each step toward greater efficiency in organizing production

simultaneously creates new uncertainties by liberating time and enabling unforeseen demands to emerge.

The economic system is therefore in perpetual motion, not because it fails to coordinate but because coordination itself drives transformation. The quest to minimize T_s/T_C - to reclaim time from necessity—ensures that economic evolution is self-sustaining. Specialization liberates time. Freed time enables unforeseen wants. Unforeseen wants drive further specialization. The cycle never ends because its fuel - the human desire to be free from necessity - is inexhaustible.

6. Conclusion

This paper has developed a temporal framework for understanding why economic change is endogenous and perpetual. The central argument is straightforward: specialization operates through time allocation, not merely output expansion. Division of labor reduces the time required for survival, creating discretionary time that enables unforeseen wants to emerge. Entrepreneurs respond to these wants through further specialization, which liberates more time, perpetuating the cycle. Coordination success thus generates its own disruption.

The framework's contribution lies in connecting the classical engine of progress—the division of labor—to ongoing structural change through the mechanism of time liberation. By establishing the identity $T_s + T_C \equiv O(S)$ and deriving the relationship $T_C = T_s \times M$, we formalize how organizational efficiency translates into discretionary time. The concept of Productivity-Yielding Demand explains why this freed time drives perpetual change: new wants emerge that depend on temporal conditions not previously available, creating genuine ignorance about future economic structure that no amount of information gathering can resolve.

This account is descriptive rather than prescriptive. The framework does not evaluate whether particular organizational forms are desirable, nor does it address distributional questions about who captures the benefits of time liberation. It identifies a mechanism—specialization creates discretionary time, which enables unforeseen demand, which drives further specialization—without claiming this mechanism operates uniformly across societies or that it represents the only source of economic change. External shocks, institutional variations, and path dependencies all matter; the temporal dynamic described here operates within and alongside these forces.

The framework suggests several directions for further inquiry. First, the distinction between organizational complexity that liberates time (raising M) versus complexity that absorbs productivity gains without freeing time (where improvements in T_T are offset by declines in T_{IP} or T_{IS}) warrants systematic investigation. Second, the sectoral dynamics of displacement deserve closer attention: how do mature markets shed labor time while maintaining output, and where does that freed labor reallocate? Third, the institutional conditions that enable or constrain the PYD mechanism—particularly how foundational rules (T_{IS}) shape whether freed time translates into entrepreneurial opportunity—require examination.

Economic change is perpetual because specialization is self-disrupting. The very efficiency that reduces the time cost of survival creates the temporal space for new wants to emerge, ensuring that the economic system never settles but continuously evolves. Understanding this temporal dynamic is essential for understanding why, as Hayek observed, unforeseen change is the fundamental economic problem.

7. References

- Aguiar, M., & Hurst, E. (2007). Measuring trends in leisure: The allocation of time over five decades. *The Quarterly Journal of Economics*, 122(3), 969–1006. <https://doi.org/10.1162/qjec.122.3.969>
- Arthur, W. B. (1994). *Increasing returns and path dependence in the economy*. University of Michigan Press.
- Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517. <https://doi.org/10.2307/2228949>
- Böhm-Bawerk, E. V. (1891). *The positive theory of capital* (W. Smart, Trans.). Macmillan and Co. (Original work published 1889).
- Coase, R. H. (1937). The nature of the firm. *Economica*, 4(16), 386–405. <https://doi.org/10.1111/j.1468-0335.1937.tb00002.x>
- Garrison, R. W. (2001). *Time and money: The macroeconomics of capital structure*. Routledge.
- Georgescu-Roegen, N. (1971). *The entropy law and the economic process*. Harvard University Press.
- Jaques, E. (1990). The enigma of time. In J. Hassard (Ed.), *The sociology of time* (pp. 21–33). Macmillan. (Original work published 1982).
- Kahneman, D. (2011). *Thinking, fast and slow*. Penguin Books.
- Kirzner, I. M. (1973). *Competition and entrepreneurship*. University of Chicago Press.
- Levy, D. (1994). Chaos theory and strategy: Theory, application, and managerial implications. *Strategic Management Journal*, 15(S2), 167–178. <https://doi.org/10.1002/smj.4250151011>
- Malmgren, H. B. (1961). Information, expectations, and the theory of the firm. *The Quarterly Journal of Economics*, 75(3), 399–421. <https://doi.org/10.2307/1884850>
- Metcalfe, J. S. (2001). Institutions and progress. *Industrial and Corporate Change*, 10(3), 561–586. <https://doi.org/10.1093/icc/10.3.561>
- O’Driscoll, G. P., Jr. (1977). Spontaneous order and the coordination of economic activities. *Journal of Libertarian Studies*, 1(2), 137–151.
- O’Driscoll, G. P., Jr., & Rizzo, M. J. (1985). *The economics of time and ignorance*. Blackwell.

- Penrose, E. T. (1995). *The theory of the growth of the firm*. Oxford University Press. (Original work published 1959).
- Prigogine, I., & Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. Bantam Books.
- Rizzo, M. J. (1996). Introduction: Time and ignorance after ten years. In G. P. O'Driscoll Jr. & M. J. Rizzo (Eds.), *The economics of time and ignorance* (pp. ix–xxvi). Routledge.
- Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. Harper & Brothers.
- Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*. University of Illinois Press.
- Smith, A. (1986). *The wealth of nations: Books I–III*. Penguin Books. (Original work published 1776).
- von Haslingen, H. (2000). *The force of time – Time, economics and the organisation of specialisation – An essay in Kairosian economics* [Bachelor's thesis, Linköping University].
- von Hayek, F. A. (1937). Economics and knowledge. *Economica*, 4(13), 33–54. <https://doi.org/10.2307/2626876>
- von Hayek, F. A. (1945). The use of knowledge in society. *The American Economic Review*, 35(4), 519–530.
- von Hayek, F. A. (1990a). The meaning of competition. In S. Littlechild (Ed.), *Austrian economics III* (pp. 171–183). Edward Elgar. (Original work published 1946).
- von Hayek, F. A. (1990b). Competition as a discovery procedure. In S. Littlechild (Ed.), *Austrian economics III* (pp. 184–195). Edward Elgar. (Original work published 1978).
- Womack, J. P., & Jones, D. T. (1996). *Lean thinking: Banish waste and create wealth in your corporation*. Simon & Schuster.
- Yang, X., & Ng, Y.-K. (1993). *Specialization and economic organization: A new classical microeconomic framework*. North-Holland.