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General Equilibrium of the Economy - or *Dynamic Equilibration*?

Essay XI

General Equilibrium of the Economy - or *Dynamic Equilibration*?

Foreword

The theory of the general equilibrium of the economy is still commonly taught in terms of aggregate Supply and Demand.

My aim in this article is to present an alternative approach that emphasizes the link between trade and capital flows, considering the cycle of production, revenue and consumption ($P/R_{t1,2}$ => $R/C_{t2,3}$)—recognizing that these flows exist in a state of constant motion rather than one of static equilibrium. This approach allows us to understand how the economy—despite its occasional crises—can operate coherently within a relatively narrow range of variation, normally without significant disruptions. In place of the concept of general equilibrium, I propose that of **equilibration**, which I find to align more coherently with the systemic nature of the mechanisms of trade and financial flows.

Examination of the Conditions of General Equilibrium

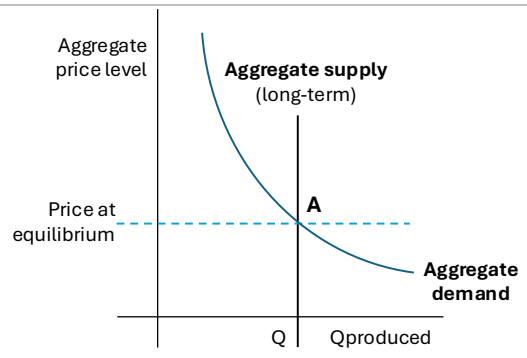
I consider the aggregation of individual supplies and demands into a global Supply and Demand to be problematic. The transition from the microscopic to the macroscopic level is not without risk because of the systemic nature of the aggregates involved. Indeed, the economy is consistent in all aspects with the concept of a **system**.

> *The economy is made up of a collection of actors (consumers, entrepreneurs, savers, borrowers, and the state) connected in a form of circular interdependence such that the marginal behavior of some elements is likely to influence other elements, modifying or transforming the entire system without changing its nature.*

This interconnectedness gives rise to emergent phenomena, of which one of the best-known is inflation. Inflation has been well characterized and has been proven to be possible only within a system: a localized increase in prices tends to trigger similar actions among other actors (e.g., a catch-up effect), which then spread throughout the economy through circular interactions—i.e., feedback loops—occurring over time.

Given the complexity of this environment, the schema of the general equilibrium of the economy (Figure 1), by simplifying this complex system to only two variables (the price level and the quantity produced), clearly lends itself to criticism.

Figure 1—Aggregate Supply and Demand



Abbreviations: A: point of equilibrium; Q: quantity.

Source: G.N. Mankiw and M.P. Taylor, Principes de l'économie (3rd ed.) Louvain-la-Neuve: de Boeck Supérieur, 2013; p. 979.

Between individual demands and global Demand, the following emergent phenomena (among others) may arise:

- *Information (branding, advertising, reputation)*
- *Competition*
- *Resource or energy shortages*
- *Inflation*
- *Collective expectations*
- *Unsold items*
- *Budget constraints*

Indeed, this schema's weaknesses are impossible to ignore, and I find them sufficiently important that I will take the liberty of challenging this representation of the aggregate balance of the economy. This challenge is based on the following arguments:

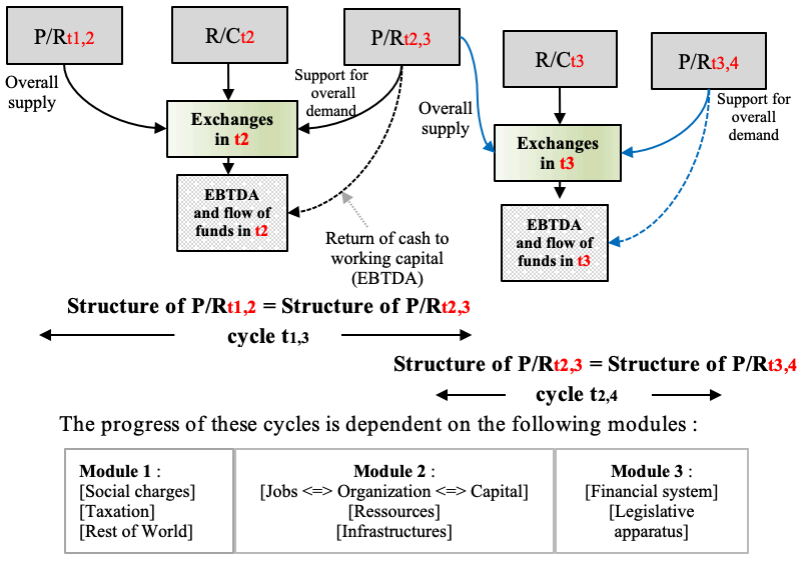
- Using summation to raise individual supplies or demands to the macroscopic level in no way permits determination of the elasticity of the aggregate function.
- The model in Figure 1, being reduced to only two variables, is entirely insufficient to permit identification of the point of equilibrium.
- The factor of **time** is ignored—an insurmountable omission which I consider to invalidate this model.
- The notion of curve displacement introduced by Mankiw and Taylor to account for the dynamics of the system in question, although attractive, is ultimately unconvincing.

These observations lead me to formulate the conditions of macroscopic stability in terms of **equilibration** rather than equilibrium: this concept is the subject of the next section.

The Economic Cycle and Its Structure

From the production of goods and services to their supply and consumption, time passes in a cycle that can be represented by the model $P/R_{t1,2}$ => $R/C_{t2,3}$ as shown in Figure 2.

Figure 2—Structure of the Model $P/R_{t1,2}$ => $R/C_{t2,3}$



The articulation of these cycles as shown in Figure 2 illustrates the link of continuity uniting them, which limits the utility of formulating equations specific to each one. This model is translated into figures in the following section, which reveals the complexity of the interactions between the real and financial economies, in constant fluctuation.

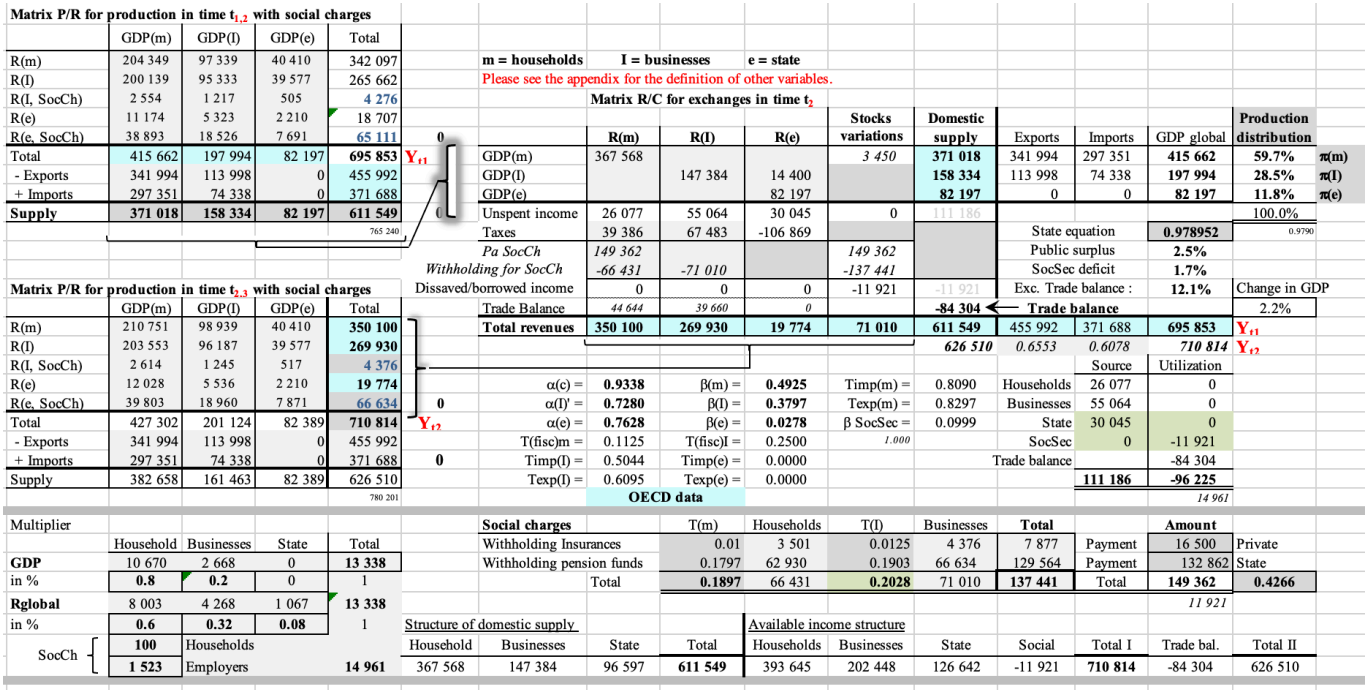
Legend:
$P/R_{t1,2}$ and $P/R_{t2,3}$ represent the dual structures of production and revenue. R/C_{t2} represents the structure of trade, with goods and services being exchanged for cash which flows into the sellers' working capital.

See appendix for definition of terms.

Presentation of the Model

The figures presented in Table 1 provide a reasonably faithful illustration of the structure of the Swiss economy in 2016-2017; it is hard to be more precise due to the difficulty of capturing certain figures scattered through the statistical series.

Table 1—Our Model in Figures: The Example of Switzerland from 2016 to 2017



Matrix P/R for production in time $t_{1,2}$ with social charges																	
	GDP(m)	GDP(I)	GDP(e)	Total													
R(m)	204 349	97 339	40 410	342 097		m = households	I = businesses	e = state									
R(I)	200 139	95 333	39 577	265 662		Please see the appendix for the definition of other variables.											
R(I, SocCh)	2 554	1 217	505	4 276		Matrix R/C for exchanges in time t_2											
R(e)	11 174	5 323	2 210	18 707						Stocks	Domestic					Production	
R(e, SocCh)	38 893	18 526	7 691	65 111	0		R(m)	R(I)	R(e)	variations	supply	Exports	Imports	GDP global		distribution	
Total	415 662	197 994	82 197	695 853	Y_{t1}	GDP(m)	367 568			*3 450*	**371 018**	341 994	297 351	**415 662**		**59.7%**	π(m)
- Exports	341 994	113 998	0	455 992		GDP(I)		147 384	14 400		**158 334**	113 998	74 338	**197 994**		**28.5%**	π(I)
+ Imports	297 351	74 338	0	371 688		GDP(e)			82 197		**82 197**	0	0	**82 197**		**11.8%**	π(e)
Supply	**371 018**	**158 334**	**82 197**	**611 549**	0	Unspent income	26 077	55 064	30 045	0	111 186					100.0%	
				765 240		Taxes	39 386	67 483	-106 869			State equation			**0.978952**	0.9790	
						Pa SocCh	*149 362*			*149 362*		Public surplus			**2.5%**		
					Withholding for SocCh		*-66 431*	*-71 010*		*-137 441*		SocSec deficit			**1.7%**		
Matrix P/R for production in time $t_{2,3}$ with social charges					Dissaved/borrowed income		0	0	0	-11 921	-11 921	Exc. Trade balance :			**12.1%**	Change in GDP	
	GDP(m)	GDP(I)	GDP(e)	Total		Trade Balance	*44 644*	*39 660*	*0*		**-84 304**	← **Trade balance**				2.2%	
R(m)	210 751	98 939	40 410	**350 100**		**Total revenues**	**350 100**	**269 930**	**19 774**	**71 010**	**611 549**	455 992	371 688	**695 853**	Y_{t1}		
R(I)	203 553	96 187	39 577	**269 930**							***626 510***	*0.6553*	*0.6078*	***710 814***	Y_{t2}		
R(I, SocCh)	2 614	1 245	517	4 376									Source	Utilization			
R(e)	12 028	5 536	2 210	**19 774**		α(c) =	**0.9338**	β(m) =	**0.4925**	Timp(m) =	0.8090	Households	26 077	0			
R(e, SocCh)	39 803	18 960	7 871	66 634	0	α(I)' =	**0.7280**	β(I) =	**0.3797**	Texp(m) =	0.8297	Businesses	55 064	0			
Total	427 302	201 124	82 389	**710 814**	Y_{t2}	α(e) =	**0.7628**	β(e) =	**0.0278**	β SocSec =	0.0999	State	30 045	0			
- Exports	341 994	113 998	0	455 992		T(fisc)m =	0.1125	T(fisc)I =	0.2500	*1.000*		SocSec	0	-11 921			
+ Imports	297 351	74 338	0	**371 688**	**0**	Timp(I) =	0.5044	Timp(e) =	0.0000			Trade balance		-84 304			
Supply	382 658	161 463	82 389	626 510		Texp(I) =	0.6095	Texp(e) =	0.0000				**111 186**	**-96 225**			
				780 201				**OECD data**						*14 961*			
Multiplier						**Social charges**		T(m)	Households	T(I)	Businesses	**Total**		**Amount**			
	Household	Businesses	State	Total		Withholding Insurances		0.01	3 501	0.0125	4 376	7 877	Payment	16 500	Private		
GDP	10 670	2 668	0	**13 338**		Withholding pension funds		0.1797	62 930	0.1903	66 634	129 564	Payment	132 862	State		
in %	**0.8**	**0.2**	0	1			Total	**0.1897**	66 431	**0.2028**	71 010	**137 441**	Total	**149 362**	**0.4266**		
Rglobal	8 003	4 268	1 067	**13 338**										*11 921*			
in %	**0.6**	**0.32**	**0.08**	1	Structure of domestic supply				Available income structure								
SocCh	**100**	Households			Household	Businesses	State	Total	Households	Businesses	State	Social	Total I	Trade bal.	Total II		
	1 523	Employers		**14 961**	367 568	147 384	96 597	**611 549**	393 645	202 448	126 642	-11 921	**710 814**	-84 304	626 510		

The variables indicated below the R/C matrix are ratios associated with their referents, which are defined in the appendix. For example, α(c), α(I), and α(e) tell us the propensities of consumers, entrepreneurs, and the state to spend or invest their income, and β(m), β(I), and β(e) correspond to the proportions of global revenue distributed to each class of actors. The other ratios listed are also defined for each relevant class of actors. The values of these variables are determined after the exchanges at t2; they are related as described by Equation 1 below (known as the *state of the system*), which gives us the degree of identity of the structures $P/R_{t1,2}$ and $P/R_{t2,3}$. In this particular case, these structures are different because of the intercalated growth impulse (i.e., the multiplier) of Fr 14,961.

Equation 1—State of the System

$$(\alpha_c\beta_m((1-(tf_m+Ts_m^{ret}-Ts_m^v)))(\frac{(1-Ti_m)}{(1-Te_m)})+(\alpha_I\beta_I*(1-tf_I))(\frac{(1-Ti_I)}{(1-Te_I)})+(\alpha_e(\beta_m tf_m+\beta_I tf_I+\beta_e))(\frac{(1-Ti_e)}{(1-Te_e)})=\left[\frac{Y_{t1}}{Y_{t2}}\right]$$

See appendix for definition of terms.

I consider this equation significant for the following reasons:

- The equality $Y_{t1}/Y_{t2} = 1$ constitutes the pivot around which the system oscillates. When Y_{t1}/Y_{t2} is equal to 1, the structures of the matrices $P/R_{t1,2}$ and $P/R_{t2,3}$ are identical.
- This ratio differs from unity, indicating that the structures of the two matrices are different, when $Y_1 \neq Y_2$ due to the integration of a multiplier (positive or negative) into the cycle.
- The interdependencies among the system's variables are visible.
- The duality of the P/R matrix—in the sense that in the ideal case, the structures of global Supply and Demand are identical—is written:

  $$Duality: Supply_{to\ t2}^{from\ t_{1,2}}\ and\ Demand_{to\ t2}^{from\ t_{2,3}}.$$

  This duality is expressed through the link between phases 1 and 2 of the cycle (i.e., $t_{1,2}$ and $t_{2,3}$), and is resolved through trade.

This equation, specific to trade, is closely related to that concerning residual cash flows after return of cash to the treasury (EBTDA), in this case in the 2.2% growth phase:

Equation 2—State of Fund Flows

$$(1-\alpha_c)\beta_m(1-(tf_m+Ts_m^{ret}-Ts_m^{v}))Y_{t2}+(1-\alpha_I)(\beta_I*(1-tf_I))Y_{t2}+(1-\alpha_e)(\beta_m tf_m+\beta_I tf_I+\beta_e)Y_{t2}+$$

Unspent household income — Dissaving or borrowing by business — Dissaving or borrowing by state

$$+(\beta_m(Ts_m^{ret}+Ts_I^{ret}-Ts_m^{v})Y_{t2}+\left(\frac{1-Te_{m,I,e}}{1-Ti_{m,I,e}}-1\right)Y_{t1}=\boldsymbol{Y_{t2}-Y_{t1}}$$

Balance of social accounts — Balance of trade

See appendix for definition of terms.

The corresponding amounts are visible in the source and utilization table on the right-hand side of Table 1. At equilibrium, this equation would be equal to zero. However, in this case, we observe an inequality—a surplus of resources—corresponding to the impulsion of the intercalated multiplier advanced prospectively by entrepreneurs. The similarity in structure between Equation 1 and Equation 2 should be noted, as it highlights their close correlation. The task of reprocessing positive and negative flows of funds is given to the banking system through the mechanism of intermediation, thereby allowing the $P/R_{t1,2}$ => $R/C_{t2,3}$ cycle to be completed.

Table 1 reveals how consecutive cycles overlap due to the duality of the P/R matrix. Under these conditions, the economy operates in a state of dynamic **equilibration** rather than one of static equilibrium. This fluctuation around the point of stability is kept in check by the antagonisms inherent in any system, which we will examine in the next section.

Equilibration and Antagonisms

The most common adjustments are prompted by internal shocks resulting from economic activity, which may occur either predictably or unexpectedly. Entrepreneurs and/or consumers react according to more or less well-considered strategies to re-establish their status or adapt to a new context; in this first case, their behavior is voluntary. External shocks such as wars, natural disasters or exhaustion of ecosystems are also likely to disturb the system; in this second case, corrections or even changes in strategy may become necessary. In both of these cases, feedback loops arise that guide the system towards its zone of equilibration, or towards a change in the level thereof. However, convergence is not guaranteed, as it depends on circumstances; if it does not occur, independent intervention becomes necessary under the public authorities' responsibility.

During relatively quiet periods, these multiple adjustments tend to lessen the antagonisms that arise between economic actors. Table 2 presents a summary of these situations of conflicting interests.

Table 2—Antagonisms

Category	Economic Actors			Comments
Commerce	**Seller** (Supply) 0	=	**Buyer** (Demand) 0	Balance
	∇Prices, ∇Profits ΔStock, ∇Production volume ΔNeed for working capital	>	∇Prices, ΔPurchasing power	Context of recession
	ΔProfits ∇Stock, ΔProduction volume	<	ΔPrices	Excess demand
Employment	**Employee** (Labor supply) 0	=	**Employer** (Labor demand) 0	Employment balance
	ΔSalaries or ∇Unemployment	<	ΔLabor costs and ∇Profits	Job market under pressure Rising inflation
	∇Salaries ΔUnemployment	>	∇Labor costs, possibly ΔProfits	Context of unemployment
Finance	**Supply of loanable funds** (households, entrepreneurs) 0	=	**Demand for loanable funds** (entrepreneurs, households) 0	Financial balance
	∇Interest, ∇Financial yield ∇Exchange rate	>	ΔDemand for loanable funds ΔInvestments	Excess supply of capital Promotes investment → multiplier
	ΔInterest ΔExchange rate	<	ΔFinancial costs ∇Borrowing, ∇Investment	Pressure on interest rates Economic downturn
State	**Public revenues** 0	=	**Public expenditures** 0	Balanced budget
	Public budget surplus	>	Insufficient investment	Surplus revenue
	State/Government living beyond its means	<	Budget deficit	Surplus expenditures, so recourse to borrowing
Balance of trade (BoT)	**Exports (A)** 0	=	**Imports (B)** 0	Trade balance
	ΔExchange rate ΔCurrency B	>	∇Exchange rate ΔQuantity of goods from A (surplus)	From perspective of A: Counterparty in foreign currency with risk for exchange rate
	∇Exchange rate ΔQuantity of goods from B (surplus)	<	ΔExchange rate ΔCurrency A	From perspective of A: External deficit and risk of indebtedness

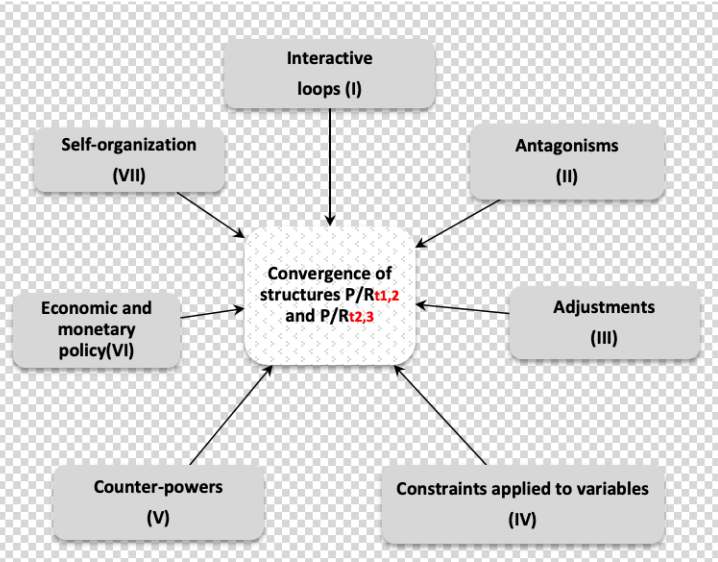
Δ = increase; ∇ = decrease.

A careful reading of this table confirms that each category of antagonism involves a situation of tension, in that factors favoring one protagonist represent harms, costs or detriments to the other. Under these circumstances, arbitration takes place and generally leads to resolution. As long as imbalances do not recur in the same way, eventually becoming constant, equilibration mechanisms are able to resist, and fluctuations are generally of low amplitude. The markets help to attenuate these antagonisms, fulfilling their role of **regulators** of the functions in question. Stability is thus achieved not only through a considerable volume of trade, but also through businesses and consumers' implementation of adjustments based on rationales adapted to the nature of the system—allowing us to speak of reasoned decisions. Moreover, these decisions are guided by the major business schools—such as the *Hautes Écoles de Commerce* (HEC)—which disseminate a universal grammar of procedures that businesses then put into practice, whereas consumers' behaviors are propagated through imitation and amplified (massified) through ambient information, notably via social networks. In contrast, business strategies such as compressing costs, eliminating jobs, or raising prices tend to disrupt the convergence of feedback loops, with negative consequences for the attractor.

The delicate processes that we have just described, which are intended to maintain the system in its space of equilibrium, give rise to the containment mechanisms described in Table 2 in terms of the resolution of antagonisms and illustrated in Figure 3.

Figure 3 This containment is based on a number of interdependent mechanisms that are essential to the continuity of the cycle represented in Figure 2. These form an **attractor** within which the equation representing the state of the model tends toward 1—that is to say, in which the structure of $P/R_{t2,3}$ approaches that of $P/R_{t1,2}$ (Figure 3). Robert Dilts defines this principle as follows: "*The attractor is simply an external reference point around which the rest of the system structures its activity*". We can thus consider self-organization and the attractor to be an inseparable pair—neither capable of existing without the other.

Figure 3—The Attractor



I) Feedback of information in a circular sequence.
II) See Table 2.
III) These reflect the behavior (rational and emotional) of economic actors in reaction to signals from the markets that do not correspond to their expectations;
IV) The system's variables are constrained in the sense that they are not permitted to take on certain values. For example, the economy cannot generate more revenues than it produces. On this subject, see my essay I, chapter V.
V) For example, trade unions, consumer protection organizations, and certain non-governemental organizations (NGOs).
VI) Used by the competent authorities, such as the Central Bank, bank supervisory authorities, and political authorities.
VII) The system's ability to adapt to society while at the same time influencing it. The ongoing reorganization of the collectivity by artificial intelligence is a fine example.

Interactively each of the modules colectivelly contributes to the rapprochement of structures of the cycles so that the adjustments maintain the system in its equilibrium zone. Any break in its limit then requires more sustained corrections, most of the time initiated by exogenous interventions.

Nevertheless, during the course of trading, even minimal shocks can bring about an abrupt collapse of containment mechanisms, most often through a process of explosive propagation. This is a phenomenon of criticality—like the straw that finally breaks the camel's back—wherein a small cause suddenly produces a substantial effect (hyperinflation or a stock market crash) that overwhelms the system's capacity for stabilization.

It is important to clarify that self-organization is one of the elements of containment of the attractor that is inherent in any system subject to a permanent process of renewal. This characteristic is defined as follows:

> *"Self-organization is a phenomenon by which a system organizes itself. Physical, biological or ecological, and social systems tend to organize themselves. This may occur as either the system's initial organization during its spontaneous emergence, or, in an existing system, the appearance of a more structured or complex organization.*
>
> *Self-organization thus acts against entropy, which is a measure of disorder (one can therefore speak of "negative entropy"). Self-organization occurs through interactions that are internal and external to the system, within and with its environment. It consumes energy which is thus used to establish and maintain the self-organized system."*[1]

This principle of self-organization is based on the following characteristics:

- The system must be made up of multiple elements.
- These elements must be linked together by **non-linear** interactions.

[1] https://fr.wikipedia.org/wiki/Auto-organisation, consulted 26 June 2023 at 17:20; definition cited in full.

- There must be interactions with the environment, either at the level of the elements or at that of the system itself.
- The system must have a boundary (spatial limits, resource limits, and so on).
- There must be regulation of the system through positive or negative feedback.
- Information must circulate freely within the system and must be understandable and in line with the needs of the elements.
- The system itself must not be guided by a purpose (although this is not the case for its components), and it must have no intentionality.

The model $P/R_{t1,2} => R/C_{t2,3}$ expresses the specific character of the economy, to be considered as a complex system endowed with non-linear functions. This non-linearity implies that, outside of extraordinary situations, general equilibrium is never achieved. Nevertheless, having an attractor, the model oscillates continually within a space whose extent varies according to the circumstances. This movement, which we are referring to as equilibration, is thus contained within a relatively flexible framework that permits it to withstand internal and external shocks without suffering harmful bifurcations.

Conclusion

The fluctuations of the model $P/R_{t1,2} => R/C_{t2,3}$ are thus part of its mechanism, constituting the signature of a complex system that is in constant motion. However, this is only a superficial view of the self-organization of the Economy (real and financial), which forms the crucible from which long-term upward or downward trends emanate. When different actors' behaviors resonate to produce sufficient amplitude, feedback loops are activated with enough energy to give a basic orientation to the system as a whole. This phenomenon results in medium-term and long-term cycles that have been the subject of unsuccessful attempts at theorization.

At the microscopic level, the use of supply and demand curves to explain the derivation of the variables {p, q}—price and quantity—for a good or service is pertinent, although some reservations are in order. From a macroscopic perspective, however, one cannot consider the aggregation of these curves to be meaningful. I have therefore found it necessary to adopt a different approach.

Seen in its totality, the Economy functions as a system, having all of the requisite characteristics as I demonstrated in my Essay No. II. In addition to this systemic character, we must also consider the principle of motion, in accordance with the progression of the cycle $P/R_{t1,2} => R/C_{t2,3}$. It is thus the process of equilibration that contributes to the stability of the model.

Appendix

Abbreviations and terms used in the text:

C	Consumption
EBDTA	Earnings before taxes, depreciation and amortization
P	Production
p	Price
q	Quantity
R	Revenue

Abbreviations and terms used in Table 1 – Our Model

α	Ratio of spending or investment to net income for specified economic actor, representing average propensity to spend (households, state) or to invest (businesses)
β	Ratio of gross income to global GDP for specified actor, representing that actor's share of global revenue
π	Ratio of GDP(actor) for specified actor to global GDP
C	Consumption
e	State (*état*)
GDP	Gross domestic product; if an actor is specified, ratio of that actor's gross income to global GDP, representing the actor's share of global revenue
I	Businesses (*investisseurs*); may also refer to investors, employers or entrepreneurs, depending on context
m	Households (*ménages*)
OECD	Organisation for Economic Co-operation and Development
P	Production
Pa SocCh	Payment to pensioners, and other beneficiares
PF	Pension funds
R	Revenue
R(e), SocCh)	Households' contributions to Social Security and pension funds
R(e)	State income
R(I, SocCh)	Businesses' (employers') contributions to Social Security and pension funds
R(I)	Business income before taxes
R(m)	Households' income
Rglobal	Global revenue
SocCh	Social charges (specifically, contributions to Social Security and pension funds)
SocSec	Social Security account
T(fisc)	Tax rate for specified actor

Abbreviations and terms used in Equation 1—State of the System and Equation 2—State of Fund Flows:

α_c	Household propensity to consume
α_e	State propensity to spend
α_I	Business propensity to invest
β_e	Value added tax
β_I	Business earnings before tax, depreciation and amortization (EBTDA)
β_m	Revenue of households
Te_e	Exportation rate for the state
Te_I	Exportation rate for businesses
Te_m	Exportation rate for households
$Te_{m,I,e}$	Total exportation rate

Matrix P/R for production in time $t_{1,2}$ with social charges

	GDP(m)	GDP(I)	GDP(e)	Total	
R(m)	204 349	97 339	40 410	342 097	
R(I)	200 139	95 333	39 577	265 662	
R(I, SocCh)	2 554	1 217	505	**4 276**	
R(e)	11 174	5 323	2 210	18 707	
R(e, SocCh)	38 893	18 526	7 691	**65 111**	0
Total	415 662	197 994	82 197	**695 853**	Y_{t1}
- Exports	341 994	113 998	0	455 992	
+ Imports	297 351	74 338	0	371 688	
Supply	**371 018**	**158 334**	**82 197**	**611 549**	0
				765 240	

m = household **I = business** **e = state**

Regarding the other variables, see the appendix.

Matrix R/C for exchanges in time t_2

	R(m)	R(I)	R(e)	Stocks variations	Domestic supply	Exports	Imports	GDP global	Production distribution	
GDP(m)	367 568			*3 450*	**371 018**	341 994	297 351	**415 662**	**59.7%**	**π(m)**
GDP(I)		147 384	14 400		**158 334**	113 998	74 338	**197 994**	**28.5%**	**π(I)**
GDP(e)			82 197		**82 197**	0	0	**82 197**	**11.8%**	**π(e)**
Unspent income	26 077	55 064	30 045	0	111 186				100.0%	
Taxes	39 386	67 483	-106 869			State equation		**0.978952**	0.9790	
Pa SocCh	*149 362*			*149 362*		Public surplus		**2.5%**		
Withholding for SocCh	*-66 431*	*-71 010*		*-137 441*		SocSec deficit		**1.7%**		
Dissaved/borrowed income	0	0	0	-11 921	-11 921	Exc. Trade balance :		**12.1%**	Change in GDP	
Trade Balance	*44 644*	*39 660*	*0*		**-84 304**	**Trade balance**			2.2%	
Total revenues	**350 100**	**269 930**	**19 774**	**71 010**	**611 549**	455 992	371 688	**695 853**	Y_{t1}	
					626 510	*0.6553*	*0.6078*	***710 814***	Y_{t2}	

Matrix P/R for production in time $t_{2,3}$ with social charges

	GDP(m)	GDP(I)	GDP(e)	Total	
R(m)	210 751	98 939	40 410	**350 100**	
R(I)	203 553	96 187	39 577	**269 930**	
R(I, SocCh)	2 614	1 245	517	**4 376**	
R(e)	12 028	5 536	2 210	**19 774**	
R(e, SocCh)	39 803	18 960	7 871	**66 634**	0
Total	427 302	201 124	82 389	**710 814**	Y_{t2}
- Exports	341 994	113 998	0	455 992	
+ Imports	297 351	74 338	0	371 688	0
Supply	382 658	161 463	82 389	626 510	
				780 201	

							Source	Utilization
α(c) =	**0.9338**	β(m) =	**0.4925**	Timp(m) =	0.8090	Households	26 077	0
α(I)' =	**0.7280**	β(I) =	**0.3797**	Texp(m) =	0.8297	Businesses	55 064	0
α(e) =	**0.7628**	β(e) =	**0.0278**	β SocSec =	0.0999	State	30 045	0
T(fisc)m =	0.1125	T(fisc)I =	0.2500	*1.000*		SocSec	0	-11 921
Timp(I) =	0.5044	Timp(e) =	0.0000			Trade balance		-84 304
Texp(I) =	0.6095	Texp(e) =	0.0000				**111 186**	**-96 225**
	OECD data							*14 961*

Multiplier

	Household	Businesses	State	Total
GDP	10 670	2 668	0	**13 338**
en %	**0.8**	**0.2**	0	1
Rglobal	8 003	4 268	1 067	**13 338**
en %	**0.6**	**0.32**	**0.08**	1
SocCh	**100**	Households		
	1 523	Employers		**14 961**

Social charges	T(m)	Households	T(I)	Businesses	**Total**		**Amount**	
Withholding Insurances	0.01	3 501	0.0125	4 376	7 877	Payment	16 500	Private
Withholding pension funds	0.1797	62 930	0.1903	66 634	129 564	dito	132 862	State
Total	**0.1897**	66 431	**0.2028**	71 010	**137 441**	Total	**149 362**	**0.4266**
							11 921	

Structure of domestic supply

Household	Businesses	State	Total
367 568	147 384	96 597	**611 549**

Available income structure

Households	Businesses	State	Social	Total I	Trade bal.	Total II
393 645	202 448	126 642	-11 921	**710 814**	-84 304	626 510

Appendix I

Abbreviations and terms used in the text:

C	Consumption	I	Investment
EBDTA	Earnings before taxes, depreciation and amortization		
P	Production		
p	Price		
q	Quantity		
R	Revenue		

Abbreviations and terms used in **Erreur ! Source du renvoi introuvable.**:

α	Ratio of spending or investment to net income for specified actor, representing average propensity to spend (households, state) or invest (businesses)
β	Ratio of gross income to global GDP for specified actor, representing the actor's share of global revenue
π	Ratio of GDP (actor) for specified actor to global GDP
e	State (*état*)
GDP	Gross domestic product: if an actor is specified, ratio of that actor's gross income to global GDP, representing the actor's share of global revenue
OECD	Organization for Economic Co-operation and Development
P	Production
Pa SocCh	Payment to pensioners, and other beneficiares
R	Revenue
R(e, SocCh)	Household Social Security contributions
R(e)	State income
R(I, SocCh)	Businesses' (employers') Social Security contributions
R(I)	Business income before taxes
R(m)	Household income
Rglobal	Global revenue
SocCh	Social charges (i.e., contributions for Social Security, pension funds, unemployment and other insurances)
SocSec	Social Security account
T(fisc)	Tax rate for specified actor
T(I)	Rate of social charges paid by businesses (employers)
T(m)	Rate of social charges paid by households (employees)
t1,2	Time period from t1 to t2 (and so on)
Texp	Exportation rate for specified actor
Timp	Importation rate for specified actor

Abbreviations and terms used in **Erreur ! Source du renvoi introuvable.** and **Erreur ! Source du renvoi introuvable.**:

α_c	Household propensity to consume
α_e	State propensity to spend
α_I	Business propensity to invest
β_e	Value added tax
β_I	Business earnings before tax (EBTDA)
β_m	Revenue due to households
Te_e	Exportation rate for the state
Te_I	Exportation rate for businesses
Te_m	Exportation rate for households
$Te_{m,I,e}$	Total exportation rate
tf_I	Business tax rate
tf_m	Household tax rate
Ti_e	Importation rate for the state
Ti_I	Importation rate for businesses
Ti_m	Importation rate for households
$Ti_{m,I,e}$	Total importation rate
Ts_m^{ret}	Rate of Social Security contributions paid by households (employees)
Ts_I^{ret}	Rate of Social Security contributions paid by businesses (employers)
Ts_m^{v}	Rate of payments to pensioners by 2nd pillar +AVS