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Growth as a chain reaction: its production function, the three growth regimes and their optima

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Abstract

Economic growth can be viewed as a chain reaction between increases in supply and demand (Kaldor, 1972). In this context, the endogenous growth model (Romer, 1986, Aghion & Howitt, 1998) which is proposed is in line with Schumpeterian (Schumpeter, 1911, 1942) and Keynesian (Keynes,1936) approaches and is based on two types of investment, capacity investment and rationalization investment (Villemeur, 2021).

In this new article, we demonstrate that three growth regimes exist, with their optima: the "Employment decline, constrained", the "Employment growth, constrained" and the "Employment growth, unconstrained". They are characterized by maximizing return on rationalization investment, return on capacity investment (constrained), return on capacity investment (unconstrained), respectively.

All lessons are consistent with the reality of 17 advanced economies over the long period (1961-2018). This growth model may reflect post-war boom economies, as well as job-creating Anglo-Saxon economies and economies with poorer macroeconomic performances since 2000. The stylized facts highlighted by Ferri (2016), Bhaduri and Marglin (1990), Storm and Naastepad (2017) and Piketty (2014) are also consistent with the lessons.

Within each growth regime, increasing the profit share in income weakens GDP growth and productivity growth, while it can improve labor market performance.

Keywords Advanced countries, Endogenous growth, Creative destruction, Effective demand, Return on investment

JEL classification D33, E22, O40, O47, O57

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1 Introduction

This article offers a new endogenous growth model, starting from Kaldor's vision of the process of economic growth (Kaldor, 1972). Kaldor carried out a series of studies aiming to characterize the process of economic growth (1956, 1961, and 1972), specifically its relationships with the principle of effective demand, accumulation of capital, increasing returns and technical progress. He concluded the following: 'Given that factor, the process of economic development can be looked upon as the resultant of a continued process of interaction–one could almost say, of a chain-reaction–between demand increases which have been induced by increases in supply, and increases in supply which have been evoked by increases in demand' (Kaldor, 1972).

This vision of a chain reaction, neglected in subsequent economic growth literature, is the foundation of a new endogenous growth model also built on many economists' ideas. The consequence of this vision of a chain reaction is that the process of growth is a process out-of-equilibrium (Amendola & Gaffard, 1998).

The role of entrepreneurs is at the heart of this new growth model and its main foundations are as follows:

- The entrepreneurs are the source of creative destruction through investments to "produce more" or "produce differently" (Schumpeter, 1911, 1942).

- The entrepreneurs make decisions on output and employment by anticipating the supply-demand balance ("principle of effective demand"), accounting for a long-term forecast of the marginal return on capital ("marginal efficiency of capital") according to Keynes (1936).

- The increasing returns are at work (Young, 1928) and must be combined with the principle of effective demand (Palley, 1996, 1997).

- The growth process is based on an *AK*-type endogenous growth model (Romer, 1986, Aghion & Howitt, 1998).

However, capital *K* does not integrate "human capital" as many models of endogenous growth do. Piketty (2014) notes that after long-term analysis of changes in the capital/income ratio and capital/labor sharing, there is no evidence that "human capital" has altered these developments. In this new growth model, technical progress is included in the labor and capital factors. Human capital favors creating new ideas and the diffusion of innovations (Nelson and Phelps, 1966).

The first growth model based on these foundations has shown the potential interest of this research method (Villemeur, 2021) and the consistency with data from the United States (U.S.) economy over the long period of prosperity (1961-2000).

In this new article, the growth model is more developed, and from it, we deduce all the theoretical lessons related to the three growth regimes and their three optima, according to the return on capacity investment or the return on rationalization investment.

To show the relevance of all lessons, we study the macroeconomic trajectories of 17 advanced economies[2], over a long period beginning from 1961, when we have precise macroeconomic data for all these countries.

In section 2, we recall the main lessons of the seminal endogenous growth model. In section 3, we extend the original growth model and we demonstrate the existence of three growth regimes and three optima, depending on the return on investments. In section 4, the fundamentals of 17 advanced economies since 1961 reveal these three growth regimes and an optimum for each

[2] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, Portugal, Spain, Sweden, United Kingdom, USA.

growth regime. In section 5, this new growth model is discussed by showing its consistency with quantitative stylized facts highlighted by Ferri (2016), Bhaduri and Marglin (1990), Storm and Naastepad (2017) and Piketty (2014). In section 6, we present the stylized growth model consistent with the evolutions of the 17 advanced economies over the long period (1961-2018).

2 Growth process: the chain reaction and its production function

In this section, we recall the development of the new endogenous growth model and the main lessons (Villemeur, 2021) in a succinct and synthetic way, in order to make the theoretical extensions that are then developed understandable.

Economic growth results from a chain reaction between demand escalations, induced by increases in supply and supply escalations, evoked by increases in demand. Each process triggers the next, which is characteristic of a chain reaction; the subsequent process can be boosted (economic boom) or stifled (stagnation or economic recession).

There are three types of investment (volume I):

- Replacement investment: with replacement investment, entrepreneurs maintain output and jobs. The volume of the replacement investment is δI, δ being the proportion of replacement. The volume of net investment is $(1-\delta)I$.
- Capacity investment: through capacity investment, entrepreneurs create jobs and produce more, with increasing returns. The share of the net investment volume committed to additional production and employment is x; it is referred to as the "Ratio of capacity investment" (Rci). The volume of capacity investment is $x(1-\delta)I$.
- Rationalization investment: by using rationalization investment, entrepreneurs destroy jobs and maintain the same production. The volume of the "rationalization investment" is $(1-x)(1-\delta)I$.

In the short term, entrepreneurs formulate expectations about fundamentals, taking into account a long-term view of the marginal efficiency of capital, reflecting confidence in the long-term state. They place themselves at the equilibrium of effective demand. At the same time, they decide to obtain the most competitive productive combinations, while considering the conditions prevailing in the different markets. For example, they must decide the volume of capacity investment or rationalization investment and the volume of jobs created or destroyed. They use simple criteria such as retaining projects with minimum total cost per unit of output, considering labor and financial market conditions.

Obviously, the expectations of entrepreneurs are rarely realized, given the great many uncertainties, their limited rationality and the unpredictable changes in many variables. However, entrepreneurs develop strategies (output, employment, investment, technologies, wage, profit…) to adapt to the new context by constantly seeking competitiveness and the balance between supply and demand. For example, for the next period, entrepreneurs must decide on the expected increase in output and the expected increase in employment. They have to choose between different technologies, some creating jobs, others destroying jobs. They must also be sure of the competitiveness of future productive combinations.

The methodology is as follows: the chain reaction is modeled for the short term, then we determine the steady states (Barro & Sala-I-Martin, 1995), over the long term, assuming that the expectations of the entrepreneurs are satisfied in reality and that the long-term growth is balanced.

Two main lessons are highlighted. First, in the new production function, the output growth rate is a linear function of employment growth rate and of net investment rate; the elasticities depend on the profit share in income and on the productivity of the capacity investment. Second, the number of 1/3 for the profit share in income is theoretically justified when wage growth is independent of employment growth.

2.1 The new production function

The first salient insight lies in the long-run linear output-employment-investment relationship that the steady states verify:

$$g_Y = \frac{1-\propto}{2\propto} g_L + \frac{A}{2} i_n \qquad 0 < \propto < 1/2 \qquad g_Y > 0 \qquad -\frac{\propto}{1-\propto} A i_n < g_L \leq \frac{\propto}{1-\propto} A i_n \tag{1}$$

The growth rates of production and employment are symbolized by g_Y and g_L ; $\propto$ and i_n are the profit share in income and the net investment rate respectively. A is the "Productivity of the capacity investment" (Pci), i.e., the productivity per unit volume of capacity investment; it is assumed to be constant in the time. The Pci reflects the productivity of the investments used in the growth of production.

This linear relationship is the result of two basic equations for the output growth rate and for the employment growth rate:

$$g_Y = A x i_n \qquad g_L = \frac{\propto A}{1-\propto}(2x-1) i_n \qquad 0 < x \leq 1 \tag{2}$$

To establish this linear equation, we assume that the profit share in income and the net investment rate are constant over time. In this production function, the output-employment coefficient $(1-\propto/2\propto)$ is always greater than the same coefficient $(1-\propto)$ in the classic Cobb-Douglas production function (1928); another difference is found in the determinant of the net investment rate instead of the capital growth rate.

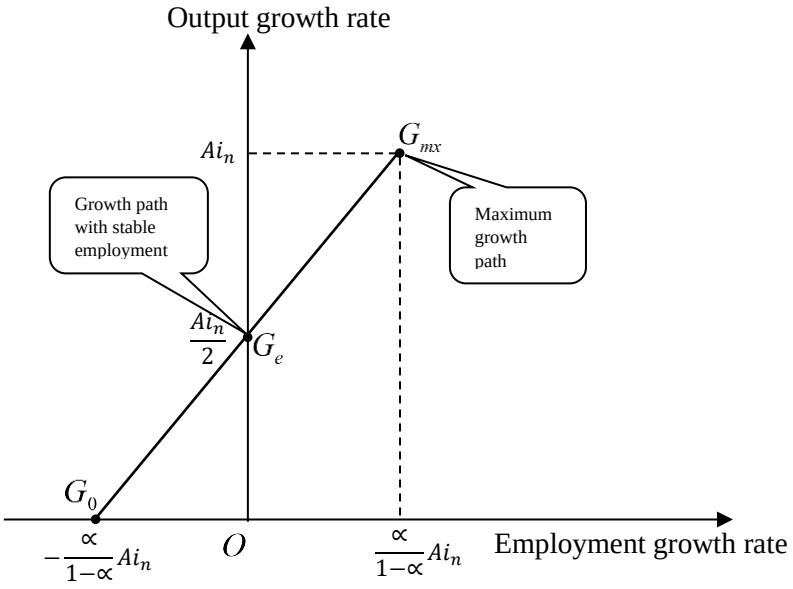

Figure 1 *The relationship between output and employment growth*

The Pci and the net investment rate are exogenous data. The first reflects the speed of technical progress made possible by the techniques used and the institutions that accompany them. It therefore does not reflect the level of technical progress; a technologically lagging economy

could be characterized by a higher Pci than the leading economy. The second depends in particular on monetary conditions, which are not discussed here.

In general, the greater the share of investments made in additional production capacity, the greater the growth. In other words, the more entrepreneurs manage to engage in increasing returns, the higher the growth.

For a given profit share in income $\propto$, the set of steady states is represented by the segment G_0G_{mx} of Figure 1. G_{mx} represents the maximum long-term growth path: the growth rates of output and employment are then maximum, with all new productive combinations being engaged in increasing returns. G_e represents the growth path with stable employment, the Rci being equal to 1/2. Over the long term, a cycle of economic growth, for example with production and employment growth rates evolving around average values, will be represented in a stylized way by trajectories located on the segment G_0G_{mx}.

Now we will deepen the role of the profit share in the production function and show that the value of 1/3 plays an important role.

2.2 The influence of the profit share in income and the value of 1/3

Figure 2 represents the zone defined by the set of line segments G_0G_{mx} when the profit share in income varies, but is at most equal to 1/2. Note that the output-employment coefficient is 1 for a profit share in income of 1/3.

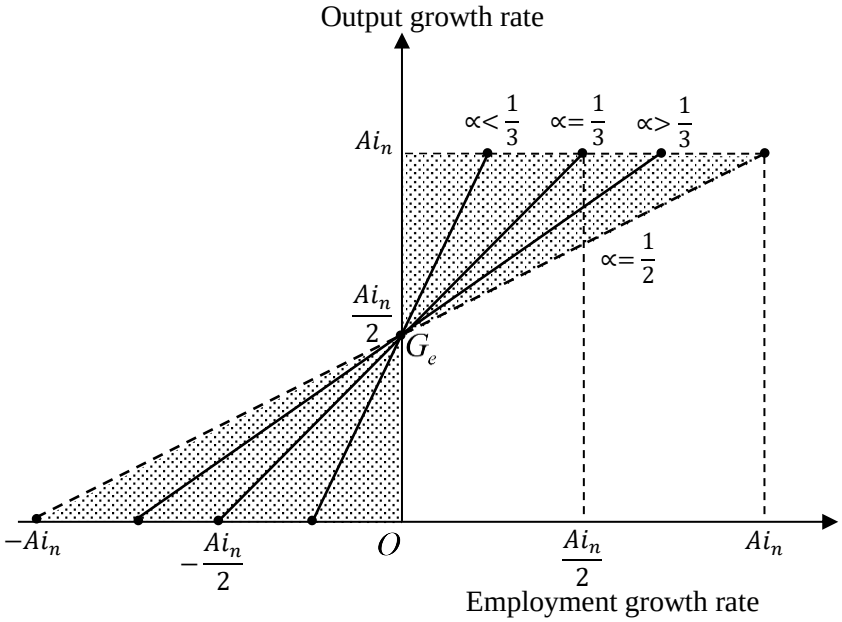

Figure 2 *Possible linear relationships*

Is the economy wage-led or profit-led? The possibility that growth regimes could be either wage-led or profit-led was first opened by Blecker (1989), Bhaduri and Marglin (1990) and Marglin and Bhaduri (1990). In Figure 2, consider a given positive employment growth rate, of course less then Ai_n, all things equal otherwise. We can see that a decrease in the profit share leads to an increase in the output growth rate; thus, the economy is wage-led. On the opposite side, if the employment growth rate is negative, the economy is profit-led. Usually, the economies have a positive employment growth rate on the long term; so theoretically, most of them are wage-led economies.

Let the labor productivity growth rate or the wage growth rate in relation to the employment growth rate be written from equations (1) and (2):

$$g_{Y/L} = g_\omega = g_Y - g_L = \frac{1 - 3 \propto}{2 \propto} g_L + \frac{A}{2} i_n = \frac{\propto + x(1 - 3 \propto)}{1 - \propto} A i_n \quad (3)$$

The number of 1/3 appears in equation (3). For this profit share, wage growth is independent of both employment growth and Rci. Thus, the wage gains in firms where employment is growing strongly will be equal to those observed in firms which are growing weakly.

This growth model offers an explanation for this number of 1/3. If the labor market operates in a perfectly homogeneous manner for the diffusion of wage gains, a wage standard is imposed on all firms and wage gains are independent of employment growth. In this case, the profit share in income must be exactly 1/3. The profit share in income of 1/3 characterizes a distribution that we will describe as "neutral", that is to say a distribution that does not distort the growth of the wages according to growth of employment.

We can now illustrate the lessons of this new model for a high-performing economy characterized by the maximal output growth rate (Rci of 1), by a perfectly functioning labor market (neutral distribution: profit share of 1/3) and by no unemployment, assuming *n* be the labor force growth rate and β the capital/income ratio :

$$x = 1 \quad \Rightarrow \quad g_Y = A i_n \quad \beta = \frac{K}{Y} = \frac{1}{A} \quad (4)$$

$$\propto = \frac{1}{3} \quad g_L = n \quad \Rightarrow \quad \frac{A}{2} i_n = n \quad i_n = 2n\beta \quad (5)$$

Table 1 presents the theoretical lessons.

Hypotheses	*Theoretical lessons*
Maximum output growth rate: $x = 1$	$g_Y = 2g_L = 2n$
Full employment ($g_L = n$) *and neutral distribution* ($\propto = 1/3$)	$i_n = 2n\beta$
Labor force growth rate: n *Capital/income ratio:* β	

Table 1 *A high-performing economy in the long term*

The output growth rate is the double of the labor force growth rate and the net investment rate depends only on the labor force growth rate and on the capital/income ratio. Thus, the macroeconomic performances of a high-performing economy are determined solely by the labor force growth rate and the capital/income ratio.

3 In theory, the three growth regimes and the regulation by return on investments

The initial growth model is now extended and we demonstrate the existence of three growth regimes and their three optima. The returns on capacity and rationalization investments play a key role in regulating economic growth. We define the return on capacity investment, the return on rationalization investment and the return on investments, respectively as the profit per unit of capacity investment[3], the profit per unit of rationalization investment and the profit per unit of investment. The return on capacity investment is assessed as the following:

[3] It is assumed that the entrepreneur increases wages, while maintaining profit share in income constant.

$$r_{ci} = \frac{\dot{Y} - \omega L_c - \dot{\omega L}}{xI_n} = \frac{\propto \dot{Y} - \omega\left(L_c - \dot{L}\right)}{xI_n} \quad with\ \dot{\omega L} = (1{-}\propto)\dot{Y} - \omega\dot{L} \tag{6}$$

The job creation associated with capacity investment L_c (Villemeur, 2021) is:

$$L_c = \frac{\propto}{1{-}\propto} A x^2 \frac{I_n}{Y} L \tag{7}$$

Finally, the return on capacity investment is:

$$r_{ci} = \propto A \frac{-x^2 + 3x - 1}{x} \tag{8}$$

The return on rationalization investment and the return on investments[4] are:

$$r_{ri} = \propto A(1 - x) \qquad\qquad r = \propto Ax \tag{9}$$

Figure 3 shows these returns as function of the Rci. The return on capacity investment will influence the decisions of entrepreneurs. This return is positive for a Rci between $(3 - \sqrt{5})/2$ (i.e., 38.2%) and 262%; the maximum is for a Rci of 100%, all the investments being capacity investments. However, when the Rci becomes greater than one, entrepreneurs have an incentive to reduce capacity investments, which limits the economic boom[5].

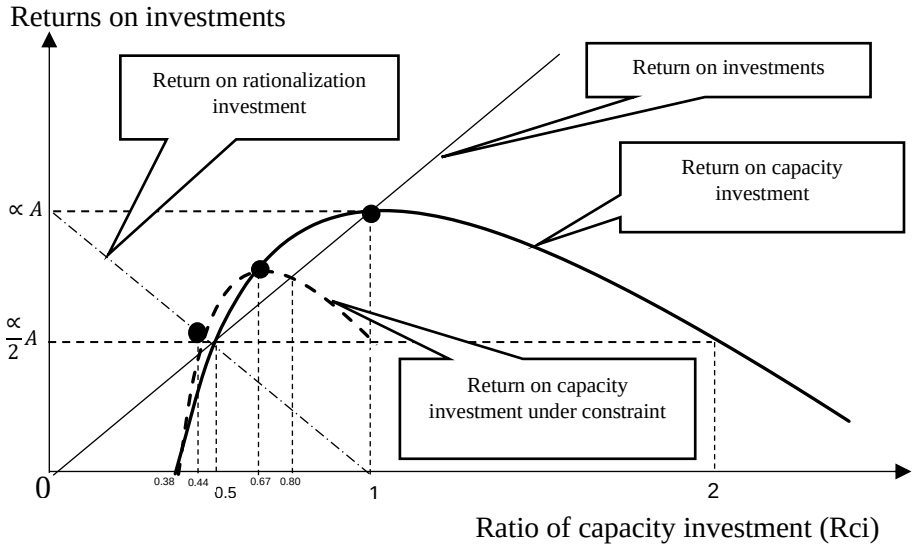

Fig. 3 *Returns on investments and the three optima*

The return on capacity investment is greater than the return on investment when the Rci is greater than 50% and less than 100%. Entrepreneurs are therefore encouraged to invest in new production capacities for such values of Rci. If there is no constraint on the different markets (labor market, financial market or technology market), they will increase the Rci up to the value of 1, in order to reach the maximum return on capacity investment. However, entrepreneurs may have to choose between more or less productivity for capacity investments and less or more volume of capacity investments when there are several technological choices; thus, they will try to maintain the capital productivity.

[4] The return on investments is also the average of the others returns weighted by x and by $(1 - x)$.

[5] When the Rci exceeds 200%, entrepreneurs are discouraged by such low returns and thus rapidly reduce their capacity investments. The value of 200% for the Rci appears as the short-term limit for the economic cycle.

When the Rci is less than 50%, the return on rationalization investment is greater than the return on investments; thus, an incentive to invest in rationalization exists. However, entrepreneurs try to maintain a positive return on capacity investment.

Theoretically, three optima exist, depending on the decisions of the entrepreneurs facing different economic situations:

- Maximization of the return on capacity investment, unconstrained

In this case the optimum is for $x = 1$ (Rci of 100%), all investments being capacity investments. This optimum characterizes maximum unconstrained growth.

$$Max\left\{\propto A\frac{-x^2+3x-1}{x}\right\} \quad \Rightarrow \quad x=1 \tag{10}$$

- Maximization of the return on capacity investment, under the constraint of the capital productivity

Entrepreneur seek to maximize the return on capacity investment under the constraint of the capital productivity (Ax). In this case the maximization is the following:

$$Max\left\{\propto A\frac{-x^2+3x-1}{x}\right\} \; under\; the\; constraint \quad Ax = constant \quad \Rightarrow \quad x = 2/3 \tag{11}$$

It is easy to show that the maximum is for $x = 2/3$ (Rci of 66.7%). The return on capacity investment under constraint is:

$$r_{ci/C} = \frac{2}{3} \propto A\frac{-x^2+3x-1}{x^2} \tag{12}$$

This return is also greater than the return on investments from the value 0.441 to the value 0.795 for x:

$$r_{ci/C} \geq r \qquad r = \propto Ax \qquad \Rightarrow \qquad 0.441 \leq x \leq 0.795 \tag{13}$$

Thus, there is an incentive to invest in capacity investment (under constraint) for x above the value of 0.44 and up to the value of 0.80. Above this last value, we can assume that the first optimization is better for the entrepreneurs if there is no more constraints for capacity investments.

- Maximization of the return on rationalization investment, the constrained return on capacity investment being higher than the return on investments

$$Max \; \propto A(1-x) \; under\; the\; constraint \; r_{ci/C} \geq r \quad \Rightarrow \quad x = 0.441 \tag{14}$$

This constraint preserves the return of capacity investment (under constraint) in order to revive the economy in the future.

Several conclusions can be drawn from these considerations. Sustainable growth regimes are such that the Rci are between 38.2% and 100%, with entrepreneurs having an incentive to return to this range if they venture outside this range. Inside the sustainable range, growth regimes should focus around 3 optima:

- Optimum 1: the maximum return of rationalization investment under constraint (Rci equal to 44,1%); this optimum is relevant for the Rci range [38.2%; 50%] which defines the “Employment decline, constrained” regime.
- Optimum 2: the maximum return of capacity investment under constraint (Rci equal to 66.7%); this optimum is relevant for the Rci range [50%; 79.5%] which defines the “Employment growth, constrained” regime.

- Optimum 3: the maximum return of capacity investment, without constraint (Rci equal to 100%); this optimum is relevant for the Rci range [79.5%; 100%] which defines the "Employment growth, unconstrained" regime.

Table 2 resumes the properties of the three growth regimes and their optima

Rci	*0*	*38.2%*	*44.1%*	*50%*	*66.7%*	*79.5%*	*100%*
Optima			*Optimum 1* Maximum return on rationalization investment (constrained)		*Optimum 2* Maximum return on capacity investment (constrained)		*Optimum 3* Maximum return on capacity investment (unconstrained)
Growth regimes	unsustainable		Employment decline, constrained		Employment growth, constrained	Employment growth, unconstrained	unsustainable

Table 2 *The three growth regimes and the three optima*

Thus, in summary, the theory predicts that the ratio of capacity investment must be within the range [38.2%; 100%] and that Rci values should cluster around 44%, 67% and 100%, reflecting entrepreneurs maximizing return on rationalization or capacity investment under different conditions.

Within the framework of the “Employment decline, constrained” regime, entrepreneurs seek to maximize the return on rationalization investment, while preserving the return on capacity investment to avoid a negative return. Thus, for this growth regime, it can be assumed that the trajectories of the economies will be influenced by this constrained maximization linked to the rationalization investment. The Rci becomes greater than 38.2% and lower than 50%. The values of the Rci should be concentrated around 44.1%.

Within the framework of the “Employment growth, constrained” regime, entrepreneurs seek to maximize the return on capacity investment, the priority being the productivity growth and not the employment growth. Thus, for this growth regime, it can be assumed that the trajectories of the economies will be influenced by this constrained maximization linked to the capacity investment. The Rci becomes greater than 50% and lower than 79.5%, the limit for the incentive with the return on capacity investment under constraint. The values of the Rci should be concentrated around 66.7% (2/3).

Within the framework of the “Employment growth, unconstrained” regime, entrepreneurs seek to maximize the return on capacity investment without constraint, the priority being employment. Thus, for this growth regime, it can be assumed that the trajectories of the economies will be influenced by this unconstrained maximization linked to the capacity investment. The Rci becomes greater than 79.5% and lower than 100%, the limit for the incentive with the return on capacity investment without constraint. The values of the Rci should be concentrated around 100% or just below.

4 The 17 advanced economies and the growth model

In this section, we show the consistency of the theorical developments with the fundamentals of the 17 advanced economies since 1961, precise annual data being available from large databases on GDP growth, on employment growth (in hours worked) and on the gross investment rate, as well as profit share in income (see Appendix 1). The 17 advanced economies

are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, Portugal, Spain, Sweden, United Kingdom, USA.

Advanced economies show wide variations in economic fundamentals, especially in profit share over the long period 1961-2018[6]. To be in the theoretical conditions of steady states with limited variations in the profit share, it is necessary to define relevant periods. Also, we have generally considered five characteristic periods, delimited by major crises. The reference periodization, that of the United States, is as follows:

- 1961-1973: the oil crisis of 1973 put an end to a period of strong economic growth, with a recession in 1974.
- 1974-1991: crises follow one another, those of the two oil crises (1973, 1979) and the financial crisis of 1990-1991. The period ended with a year of recession and 1992 marked the return of real growth.
- 1992-2000: Strong economic growth is back, driven by the emergence and rapid diffusion of information and communication technologies. The bursting of the stock market (Internet) bubble in 2000 ended this period with a significant slowdown in 2001.
- 2001-2007: economic growth slows down sharply and the great financial crisis of 2008 put an end to this period (recession in 2008).
- 2008-2018: economic growth resumes after the Great Recession of 2008-2009, but on a weaker trend than in previous periods.

The periodizations used are presented in appendix 2 for each economy. Of course, they may differ from that of the U.S., with the limits for each period subject to change by one or two years[7]. Only Australia does not experience any recession in 2008 or 2009 but a notable slowdown. Three economies (Spain, Greece, Japan) are characterized by only four periods, the crisis of 2001 not having really affected them, the third period ending with the Great Recession of 2008-2009.

Based on these data (GDP growth rate, employment growth rate, net investment rate, profit share in income), the theory presented makes it possible to calculate the mean values of Rci and Pci (Appendix 2), whose equations are recalled below:

$$x = \frac{\propto\ g_Y}{2 \propto g_Y - (1-\propto) g_L} \qquad A = \frac{2 \propto g_Y - (1-\propto) g_L}{\propto i_n} \tag{15}$$

4.1 The identification of the three optima

Can we identify the three optima by examining the characteristics of the 77 economic trajectories[8] selected for the 17 advanced economies? Figure 4 is the Rci histogram.

We note the existence of three concentrations of values, corresponding to the three optima:

- The first is on the range [40%-50%]; it seems to reflect the maximum return on rationalization investment under constraint (Rci of 44.1%) inside the "Employment decline, constrained" regime. It can be assumed that most entrepreneurs react before reaching the optimum 1.

[6] In order to avoid taking into account forecast values for a few countries, the year 2019 is not retained.

[7] For example, after the 1973 oil shock, a recession or slowdown may occur in 1975 or 1976, a return to notable economic growth in the 1990s may occur in 1993 or 1994.

[8] We have identified 82 trajectories (see Appendix 2); are not considered 2 trajectories where the output growth rates are negative (Greece and Italy 2008-2018) and 3 trajectories where the Ric is well above 1, the labor market being very unbalanced (Italy 2001-2007, Spain 1994-2008, United Kingdom 2008-2018).

- The second is on the range [60%-70%]; it seems to reflect the optimum 2, i.e., the maximum return of capacity investment growth under constraint (Rci of 66.7%) inside the "Employment growth, constrained" regime.
- The third is on the range [100%-110%]: it seems to reflect the maximum of the unconstrained return on capacity investment (Rci of 100%) inside the "Employment growth, unconstrained" regime. It can be assumed that most entrepreneurs react after reaching the optimum 3, due to optimistic behavior.

These ranges concentrate 53% of the values. Thus, 47% of the trajectories are in intermediate trajectories, reflecting a mix of trajectories with different objectives.

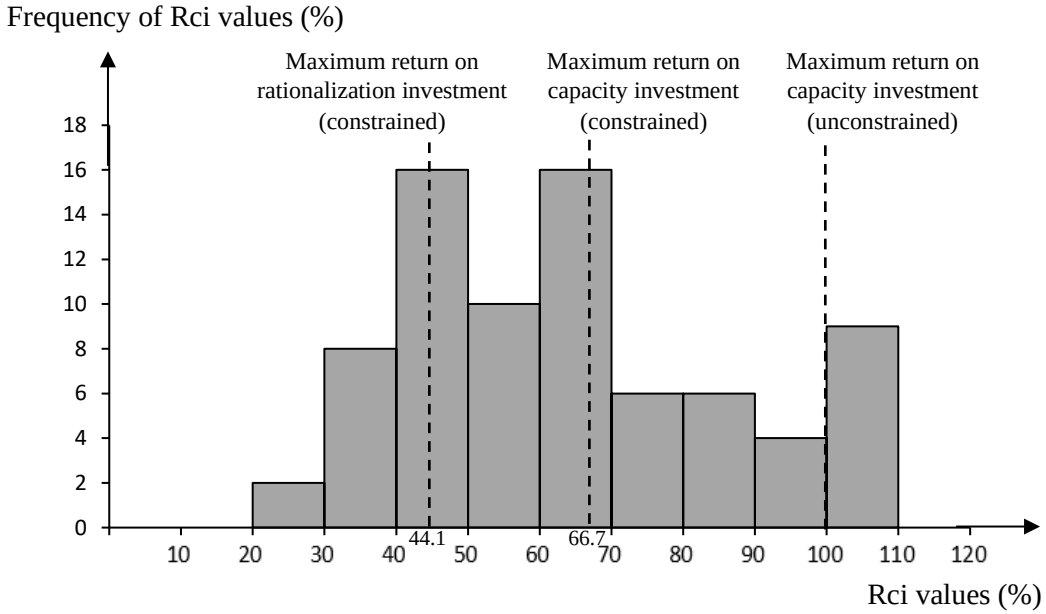

Fig. 4 *Histogram of Rci values for 17 advanced economies (1961-2018)*

4.2 The identification of the three growth regimes

All Rci values are between 20% and 110%, and 77% are within the range of sustainable growth regimes ([38.2%; 100%]). Some trajectories are outside this range: do we see the return inside the range during the following trajectory? We can identify 12 trajectories outside the theoretical range; for 10 trajectories the Rci returned to the range during the following period, for the remaining 2 trajectories, this is the case after 2 periods. Thus, all the trajectories outside the theoretical range are followed by trajectories inside the range, after a maximum of 2 periods. This fact seems to reflect the existence of economic incentives for entrepreneurs to return to sustainable growth regimes.

Can we identify the three growth regimes and test the theoretical properties that were explained previously? The 77 trajectories are distributed among the various growth regimes according the theoretical Table 2. The results are presented in Table 3; for each of the three growth regimes, we considered the cases where the profit share is lower or higher than 1/3.

Growth regimes (Mean values in %)[9]	*GDP growth rate*	*Employment growth rate*	*Productivity growth rate*	*Net investment rate*	*Profit share in income*	*Rci*	*Pci*
Employment decline, constrained (Rci<50% and profit share<1/3)	3.55	-0.61	4.16	17.7	30.2	40.7	47.4
Employment decline, constrained (Rci<50% and profit share>1/3)	1.54	-0.29	1.83	15.4	36.6	39.2	23.0
Employment growth, constrained (50%<Rci<79.5% and profit share<1/3)	4.71	0.51	4.20	18.7	29.4	59.8	42.8
Employment growth, constrained (50%<Rci<79.5% and profit share>1/3)	2.57	0.73	1.84	15.3	37.6	65.7	26.3
Employment growth, unconstrained (Rci>79.5% and profit share<1/3)	3.14	1.35	1.79	16.4	32.0	95.5	21.0
Employment growth, unconstrained (Rci>79.5% and profit share>1/3)	2.85	1.51	1.34	16.5	36.1	96.1	18.0

Table 3. *The three growth regimes (17 advanced economies since 1961)*

The properties brought to light in the different regimes are as follows:

- "Employment decline, constrained" regime: productivity gains are very important while rationalization investments very largely dominate. The profit shares are divided between those less than 1/3 (58%) and those greater than 1/3 (42%). 65% of the Rci values are between 38.2% and 50%. The mean values of Rci are 40.7% and 39.2%, compared to 44.1%.
- "Employment growth, constrained" regime: productivity grows faster than employment while capacity investment dominates. The profit shares are divided between those less than 1/3 (36%) and those greater than 1/3 (64%). The mean values of Rci are 59.8% and 65.7%, compared to 66.7%.
- "Employment growth, unconstrained" regime: employment grows rapidly while capacity investment largely dominates. The Rci values are between 79.2% and 109.9%, which is consistent with the predicted theoretical values. The mean values of Rci are 95.5% and 96.1%, compared to 100%.

These results show that the mean values of Rci are very close inside each growth regime, regardless of the value of the profit share in income, lower or higher than 1/3. Let's take the example of the "Employment decline, constrained" regime: the macroeconomic fundamentals are very different if we take into account the value of the profit share. Thus, when the profit share is less than 1/3, the GDP and the productivity growth rates are higher; nevertheless, the Rci remains close to the optimum, which again seems to reflect the same optimization. The same observation is also made for the other growth regimes.

These results, based on the fundamentals of 17 advanced economies, confirm the existence of three growth regimes structured by the different cases of maximizing the return on investment.

[9] For each growth regime in the Table 3, the number of trajectories considered are respectively 15, 11, 9, 23, 7, 12.

Finally, the study of the 17 advanced countries over 1961-2018, with their 77 economic trajectories, confirms the existence of three growth regimes. Each growth regime seems to reflect the decisions of entrepreneurs seeking to optimize the returns of investments, either of capacity investments or of rationalization investments.

These findings, developed from the fundamentals of 17 advanced economies, confirm the existence of three growth regimes determined by employment situations and comparative growth in productivity and employment. The value of the profit share, less or more than 1/3, is an important parameter influencing the macroeconomic fundamentals for the three growth regimes.

When comparing macroeconomic performance within each growth regime, it becomes clear that GDP and productivity growth decline as the profit share increases while employment growth increases. The best employment growth regime is obtained for the "Employment growth, unconstrained" regime.

5 Discussion about the growth model and the lessons

The discussion focuses on the main characteristics of this new growth model as well as its consistency with quantitative stylized facts of Ferri (2016), Bhaduri and Marglin (1990), Storm and Naastepad (2017) and Piketty (2014).

5.1 A new endogenous growth model

This new endogenous growth model belongs to the out-equilibrium economics as defined by Amendola & Gaffard (1998, p.3): “Out of equilibrium, the supply and demand processes, of resources, and of commodities no longer match. They do not match at any given moment and they do not match over time”. Thus, two main questions arise: who is the central actor in this growth process? What are the main forces to regulate the economy and ensure during certain periods the stability of the fundamentals?

As Schumpeter theorized, through creative destruction, the entrepreneur is the central actor in this new growth model, making major decisions regarding investments and employment. In our growth model, two types of investment - capacity and rationalization - are considered with very different properties linked to output and employment. It is assumed that creative destruction manifests through both types of investment and not in innovation types as many endogenous growth models assume.

With the development of Keynes’s theory of aggregate demand, the rule of aggregate demand in the growth process was recognized. However, Keynes was mainly interested in the theory of short-term unemployment. A recurring theme in alternative theories about economic growth is the role of long-term aggregate demand (Setterfield, 2010). Dutt (2010) reconciles supply and demand in long-term growth analysis and shows that "aggregate demand can have an effect on growth not only in the short term but also in the long term."

This new endogenous growth model is consistent with the ideas of Dutt and Setterfield because it shows the importance of long-term aggregate demand for one major reason: the existence of an infinite chain reaction between additional supply and additional demand where the additional demand is always decisive.

Similar to our growth model, others combine the ideas of Schumpeter and Keynes. Dosi et al. (2010, 2017) presented a family of evolutionary agent-based models, the “K+S” formalism, which combines both “Keynesian” (demand-driven) and “Schumpeterian” (innovation-driven) mechanisms. The results suggest strong complementariness between Schumpeterian and

Keynesian policies in ensuring that the economic system follows a path of sustained stable growth and employment. The "K+S" model, analyzed through Montecarlo simulations, can reproduce a wide range of macroeconomic and microeconomic stylized facts.

Unlike the K+S formalism, this new growth model is based on an analytical formalism in which Kaldor's vision provides a framework based on the chain reaction between increases in demand and supply. Kaldor's perspective is an important starting point for modeling. Our steady states represent long-term growth in which profit share in income plays an important role, thereby allowing us to compare our insights and stylized facts from a quantified point of view.

This growth model rehabilitates expectations formulated by entrepreneurs, be it on output, employment, investment, wages, profits and, of course, on future return on investment. Maximization of profit is obviously sought, but minimization of unit output cost, with a concern for long-term competitiveness, is an indispensable step, as theorized by Schumpeter. The three constraints for competitive supply are common sense for entrepreneurs, even if their rationality is limited; they can be considered as heuristics (Dosi and al., 2020)[10] for determining the effective and competitive equilibrium.

The regulation of this out-of-equilibrium growth process works in two stages. The first stage resides in the steady states of this long-term process; we assume that the expectations of entrepreneurs are met in reality and that long-run growth is balanced[11]. The second stage lies in the role of return on investment, whether capacity or rationalization, which is developed in this article.

Economic development is generally based on the material (including software) and social technologies implemented. Investments, of a material or software nature by definition, are accompanied by intangible investments (training, organization, etc.), which are not modeled here. However, the Productivity of capacity investment seems to indirectly reflect the productive efficiency of these intangible investments and also that of the functioning of the labor market. The maximum long-term growth reflects the excellence of a growth regime that combines new technologies, social technologies, innovation processes and the labor market's satisfactory functioning.

Many of the model's nonfundamental aspects have been simplified in the initial analysis to account for several anticipation dimensions. For example, the capital evolution equation has been simplified by modeling the volume of replacement investments. Investments have been categorized into the three usual categories -capacity, rationalization and replacement- while the reality may be more complex, with alternative investments that can incorporate technical progress and improve capacity. For the purpose of simplification, we did not consider the capacity utilization rate which is thus integrated into the Ratio of capacity investment.

5.2 The consistency with the quantitative stylized facts of Ferri

Ferri (2016) has established four new stylized facts that are different from those identified by Kaldor (1961) for the Golden age of capitalism and lately extended by Jones and Romer (2010): an increasing capital share[12], an augmenting wealth-output ratio, an increasing inequality process, a volatile rate of growth.

Table 4 illustrates these new stylized facts, the 17 advanced economies being considered over the different periodizations from 1961 to 2018. From the Golden age of capitalism until the last

[10] A heuristic is "a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally and/or accurately than more complex methods" (Gigerenzer and Gaissmaier, 2011, 454).

[11] In line with the studies of Harrod (1939, 1948) and Domar (1947).

[12] Karabarvounis and Neiman (2014) also established this stylized fact.

period (after the Great Recession), macroeconomic performances (GDP growth and productivity growth) are declining, while the average profit share in income is rising rapidly from 30.9% to 37.3%. The evolution of employment growth rates remains ambiguous when profit share in income reaches values of around 37%.

17 advanced economies	*GDP Growth rate*	*Employment growth rate*	*Productivity growth rate*	*Net investment rate*	*Profit share in income*
1961-1973	5.4	0.2	5.2	18.4	30.9
1974-1991	2.3	0.1	2.2	17.1	31.9
1992-2000	3.2	1.2	2.0	15.6	36.0
2001-2007	2.3	0.8	1.5	15.9	37.3
2008-2018	0.8	0.2	0.6	14.5	37.3

Table 4 *Macroeconomic fundamentals (mean in%) for each period*

These stylized facts are consistent with the growth model developed in this article. The starting point is the increase in the profit share, which in the long run depresses GDP growth and productivity growth for economies with constraints on employment growth. The rapid slowdown in GDP leads to an increase in the wealth/output ratio. In all these conditions, of course, inequalities will increase.

It can also be noted that the highest profit shares in income are linked to Greece and Italy, with more than 40% over long periods (Appendix 2). These economies experienced a severe depression over the last period 2008-2018 (negative annual growth in GDP and employment) after the Great Recession of 2008. In addition, two other economies (Finland and Sweden) experienced a profit share above 40% over a period (respectively 2001-2008, 1994-2000); profit share decreases in the next period and then no depression occurs.

Thus, a new question arises as to the sustainability of a very high profit share, typically above 40% in the long term.

5.3 The Bhaduri-Storm paradox

The vast majority of empirical studies on the Bhaduri-Marglin model (1990) find that major economies, including the United States and the European Union as a whole, have been broadly wage driven over the past few decades, while that the smaller or more open economies are profit-oriented, once foreign trade is taken into account (Onaran and Galanis, 2012; Blecker, 2014). Blecker paid more attention to the temporal dimension of this distinction; rising profits may be helpful in stimulating a recovery in the short term, but the economy is driven by wages in the long term.

Nevertheless, governments have operated since the 1980s in the neoclassical belief that full employment is possible by reducing the cost of labor and allowing low-wage flexible service jobs. “The strategy appeared to work as real wage restraint was associated with higher jobs growth” Storm and Naastepad (2017, 5) concluded. The paradox is this: how could this happen in wage-led economies?

In this new growth model, an increase of the profit share leads to an increase in the employment growth rate according to equation (2), all other things being equal. Storm and Naastepad come to the same conclusion by showing that the key point is the slowdown in labor productivity growth. This fact is consistent with the lesson of this new growth model that an increase in profit share can lower productivity growth and lead to more jobs.

5.4 The consistency with the quantitative stylized facts of Piketty

Piketty (2014) described the major changes in the profit share in income over the very long term, with the profit share generally being between 20% and 40%. Empirical examination of the distribution of wealth for more than two centuries shows also that the return on capital is higher than the growth rate of the economy ($r > g$ described as the fundamental inequality of capitalism).

Is this new growth model consistent with Piketty law? Thus:

$$r = \propto Ax \qquad g_Y = Axi_n \qquad r > g_Y \qquad \Rightarrow \qquad \propto > i_n \tag{16}$$

Our growth model, combined with the Piketty law gives a framework for the profit share:

$$i_n < \propto < \frac{1}{2} \tag{17}$$

The profit share in income for countries such as the United Kingdom and France has been between 20% and 40% since 1770 for the United Kingdom and 1820 for France. Thus, it has never been greater than 50%, which is also an upper limit for this growth model.

Profit share in income is greater than 1/3 between 1810 and 1870 for the United Kingdom, and between 1840 and 1870 for France[13], which corresponds essentially to the time of the first industrial revolution. It is also the period of Marx's analysis of industrial capitalism during which wages stagnate or even regress and profits increase. Since the 1880s, the profit share in income has almost never been significantly higher than 1/3. It is well below 30% from 1920 for the United Kingdom and 1940 for France.

The 20% lower limit for the United Kingdom or France (in the 1970s and 1980s), is also consistent with the theoretical limit, with a net investment rate of around 16%. Thus, our growth model provides a relevant framework for the profit share, consistent with Piketty's data.

As Piketty noted from historical analysis, the profit share has never exceeded 40% over long periods. This is also the case for the 17 advanced economies over the period 1961-2018; otherwise, economic depression results. These facts reinforce the question of the negative impact of very high profit share on economic performances.

6 The stylized growth model

We can now stylize our new growth model (Table 5), based on the three sustainable growth regimes, their three optima (Rci values: 44%, 67%, 100%) and profit share in income (values lower or higher than 1/3). For the profit share in income, we considered values in the range [20%; 40%] for sustainable economic growth.

The analysis of the fundamentals of the 17 advanced economies is useful to highlight the characteristics of the parameters as the net investment rate(i_n) and the Pci (A). Thus, within each growth regime, the profit share, the Pci and the net investment rate are the main determinants of the GDP growth rate and the employment growth rate. The Pci reflects the speed of technical progress made possible by the techniques used and the institutions that accompany them. It does not therefore reflect the level of technical progress; a technologically lagging economy could be characterized by a higher Pci than the leading economy. This is for example the case of France and Germany before the oil crisis (1973), compared to the first economy of the United States.

[13] The profit share exceeds 40% and reaches about 45% around 1850-1860 for the United Kingdom and France.

Growth regimes	*Profit share* *(in %)*	*GDP and employment growth* *(in %)*	*Parameters*[14] *range* *(in %)*	*Economies* *(annual GDP and employment growth, in %)*	
Employment decline, constrained	$20 < \propto \leq 33.3$	*Optimum 1* (return on rationalization investment, constrained) $g_Y = 0.44Ai_n$ $g_L = -0.12\frac{\propto}{(1-\propto)}Ai_n$	i_n (17.7 $\pm$ 1.7) A (47.4 $\pm$ 20.8)	France Germany	1961-1974 (5.6; -0.4) 1961-1973 (4.2; -0.9)
	$33.3 < \propto \leq 40$		i_n (15.4 $\pm$ 2.0) A (23.0 $\pm$ 16.9)	Japan Germany	1992-2007 (1.2; -0.5) 1994-2000 (1.9; -0.1)
Employment growth, constrained	$20 < \propto \leq 33.3$	*Optimum 2* (return on capacity investment, constrained) $g_Y = \frac{2}{3}Ai_n$ $g_L = \frac{\propto}{3(1-\propto)}Ai_n$	i_n (18.7 $\pm$ 2.7) A (42.8 $\pm$ 22.4)	Spain Japan	1961-1974 (7.2; 0.5) 1974-1991 (4.4; 0.6)
	$33.3 \leq \propto \leq 40$		i_n (15.2 $\pm$ 1.4) A (26.7 $\pm$ 10.2)	United Kingdom France	2001-2007 (2.8; 0.7) 2001-2008 (1.7; 0.6)
Employment growth, unconstrained	$20 < \propto \leq 33.3$	*Optimum 3* (return on capacity investment, unconstrained) $g_Y = Ai_n$ $g_L = \frac{\propto}{(1-\propto)}Ai_n$	i_n (16.2 $\pm$ 1.3) A (24.1 $\pm$ 10.1)	Canada USA	1961-1974 (5.1; 1.8) 1961-1973 (4.3; 1.6)
	$33.3 \leq \propto \leq 40$		i_n (16.8 $\pm$ 2.1) A (16.0 $\pm$ 5.9)	Canada USA	1993-2000 (3.4; 1.9) 1974-1991 (2.8; 1.5)

Table 5 *The three sustainable growth regimes and the stylized fundamentals*

In general, it appears that increasing the profit share weakens GDP growth or productivity growth and improves labor market performance. Nevertheless, the employment growth rates seem to be constant or decreasing for a profit share above around 37% as shown in Table 4.

The “Employment decline, constrained” regime reflects, when the profit share is less than 1/3, many European countries during the post-war boom, with strong GDP and productivity growth, and otherwise, European economies with intermediate GDP and productivity growth.

The "Employment growth, constrained" regime reflects, when the profit share is less than 1/3, some European countries and Japan before 2000, with high GDP and productivity growth, and otherwise, European economies just after 2000 with intermediate performances.

The "Employment growth, unconstrained" regime often reflects Anglo-Saxon economies, such as Australia, Canada, and United States, which are able to create far more jobs than other economies.

7 Conclusion

This new endogenous growth model, type $\dot{Y} = Ax\dot{K}$, in line with Schumpeterian and Keynesian approaches, is based on two types of investment, capacity investment and rationalization investment. This growth model leads to very different equations for the growth rates of production and employment:

[14] Mean and standard deviation.

$$g_Y = Axi_n \qquad g_L = \frac{\propto A}{1-\propto}(2x-1)i_n \qquad g_Y = \frac{1-\propto}{2\propto} g_L + \frac{A}{2} i_n$$

where A is the productivity of the capacity investment, x the Ratio of capacity investment (Rci), i_n the net investment rate and $\propto$ the profit share in income.

We have theoretically shown that there are three growth regimes and three optima:

- the “Employment decline, constrained” regime, where the optimum is maximization (under constraint) of the return on rationalization investment (Rci of 44%):
- the “Employment growth, constrained” regime, where the optimum is maximization (under constraint) of the return on capacity investment (Rci of 67%):
- the “Employment growth, unconstrained” regime, where the optimum is maximization (without constraint) of the return on capacity investment (Rci of 100%).

For example, many European economies and Japan, with strong GDP and productivity growth during the post-war boom, are represented by the "Employment decline, constrained" regime or by the “Employment growth, constrained” regime, with a profit share of less than 1/3.

Anglo-Saxon economies, such as Australia, Canada and the United States, which are able to create many more jobs than other economies, are often represented by the "Employment growth, unconstrained" regime.

Since the year 2000, the advanced economies are generally represented by the first two growth regimes with a share of profit in income greater than 1/3 and with poorer macroeconomic performances.

Thus, the study of the fundamentals of 17 advanced economies (1961-2018) confirms the existence of three growth regimes and their three optima. Many trajectories for the 17 advanced countries center around these Rci values of 44%, 67% and 100%. A main lesson emerges concerning the behavior of entrepreneurs: they seek to maximize the return on investments, either rationalization investment or capacity investment, sometimes under certain constraints. This overview confirms the interest of considering the two types of investment that determine the behavior of entrepreneurs.

Generally speaking, from a macroeconomic point of view, another lesson emerges from the theoretical and empirical study of the trajectories of the 17 advanced economies. Within each growth regime, increasing the profit share in income weakens GDP growth or productivity growth, while it can improve labor market performance. The best employment growth regime is obtained for the "Employment growth, unconstrained" regime.

For sustainable growth regimes, it appears that profit share values are typically between 26% and 40%; a profit share above 40% is very detrimental to economic growth and can lead to depression in later periods. When the profit share becomes higher than 37%, the effect on the labor market may be uncertain, the rate of employment growth no longer increases and may even decrease.

Within each growth regime, the study of the trajectories show that macroeconomic performances can be very diverse, even if the trajectories are under the influence of the same optimum. This fact reflects the probable influence of other parameters that are not taken into account in this growth model, such as the financial market.

In view of these results, obtained by simplified modeling, this new avenue of research appears promising in order to better understand the economic fundamentals of the most advanced countries and the role of profit share in economic growth.

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Appendix 1: The data sources

The data are from the World Bank (World Development Indicators-WDI-June 2021) for the GDP growth rate and the gross investment rate (in % GDP), from the Groningen Center for the growth rate of total hours worked (The conference Board and Groningen Growth and Development Center, Total Economy Database, June 2021, http://www.ggdc.net). Data on the profit share in income (adjusted share to factors costs) from 1961 to 2019 is taken from the European Commission (Annual macro-economic database -AMECO- June 2021). The sometimes-missing data (between 1961 and 1969) come from the European Commission (Report n°73-2001). In the absence of net investment in databases, it is assumed that the proportion of replacement investment is typically 30%.

Appendix 2: The 17 advanced economies (1961-2018): data (in %)

Economy	Period	g_Y	g_L	i_n	$\propto$	*Rci*	*Pci*
Australia	1961-1974	4.7	2.3	21.4	35.4	92.1	23.6
	1975-1992	2.9	1.4	18.8	31.5	103.2	14.8
	1993-2000	4.2	1.9	17.3	35.5	86.9	27.7
	2001-2008	3.3	1.9	18.5	38.6	93.8	19.1
	2009-2018	2.6	1.3	18.4	40.9	79.2	17.7
Austria	1961-1974	4.8	-0.3	20.0	27.4	45.8	52.9
	1975-1993	2.3	-0.2	18.0	29.4	45.8	28.5
	1994-2000	2.9	0.6	17.9	34.0	62.1	25.8
	2001-2008	2.2	0.5	16.4	38.5	60.9	21.8
	2009-2018	1.0	0.3	16.0	37.5	68.4	9.3
Belgium	1961-1974	4.9	-0.1	18.2	36.5	48.9	55.0
	1975-1993	1.9	-0.8	15.5	30.0	34.3	35.8
	1994-2000	2.8	1.3	15.2	30.8	106.5	17.6
	2001-2008	2.1	0.8	15.5	32.2	86.0	15.4
	2009-2018	1.2	0.6	16.0	32.7	103.0	7.4
Canada	1961-1974	5.1	1.8	16.1	31.4	82.5	38.3
	1975-1992	2.5	1.4	15.7	34.1	103.6	15.5
	1993-2000	3.4	1.9	13.7	34.4	107.3	23.3
	2001-2008	3.7	1.4	15.2	38.3	72.1	33.7
	2009-2018	1.7	0.8	16.4	37.6	80.2	12.7
Denmark	1961-1973	4.6	0.4	17.2	31.7	55.9	47.4
	1974-1993	1.7	-0.7	14.6	31.5	34.4	34.7
	1994-2000	3.3	1.3	14.2	36.3	76.2	30.9
	2001-2007	1.6	0.5	15.1	35.5	67.5	16.0
	2008-2018	0.9	-0.1	14.0	35.1	46.3	14.5
Finland	1961-1973	4.8	-0.1	19.0	26.7	48.3	52.6
	1974-1993	2.1	-1.1	19.1	29.1	30.8	35.3
	1994-2000	4.8	1.6	14.8	37.9	68.1	48.0
	2001-2008	2.9	1.0	16.0	40.6	65.8	27.5
	2009-2018	0.2	-0.1	15.8	37.4	33.9	4.4
France	1961-1974	5.6	-0.4	18.0	27.1	45.5	68.1
	1975-1993	2.2	-0.5	16.1	28.2	39.1	35.8
	1994-2000	2.7	0.7	14.2	34.4	67.4	28.5
	2001-2008	1.7	0.6	15.4	35.5	73.8	14.9
	2009-2018	0.9	0.2	15.5	33.2	66.8	8.9
Germany	1961-1973	4.2	-0.9	18.3	31.6	40.9	55.8
	1974-1993	2.3	-1.1	16.8	31.8	33.5	41.0
	1994-2000	1.9	-0.1	16.2	35.8	48.4	24.3
	2001-2008	1.3	0.0	14.0	37.6	49.9	18.6
	2009-2018	1.3	0.5	14.1	36.3	77.5	12.0
Greece	1961-1973	8.5	-0.9	18.5	32.7	45.1	102.5
	1974-1993	1.5	0.8	18.2	42.0	81.8	9.8
	1994-2007	3.6	1.2	16.1	44.0	63.7	35.2
	2008-2018	-2.5	-1.5	10.3	41.5		

Economy	Period	g_Y	g_L	i_n	$\propto$	*Rci*	*Pci*
Italy	1961-1974	5.4	-1.0	17.7	29.6	40.8	74.3
	1975-1993	2.4	0.3	16.2	34.2	55.6	26.5
	1994-2000	2.2	0.4	13.7	40.5	58.7	27.3
	2001-2007	1.1	1.1	14.9	40.9	170.9	4.4
	2008-2018	-0.4	-0.5	12.9	39.3		
Japan	1961-1973	8.8	1.1	23.8	28.6	59.6	62.3
	1974-1991	4.0	0.6	22.7	26.2	62.1	28.5
	1992-2007	1.2	-0.5	19.2	33.8	34.3	17.6
	2008-2018	0.5	-0.1	16.2	37.2	40.8	7.8
Netherlands	1961-1974	5.1	0.8	18.9	30.3	61.3	43.8
	1975-1993	2.1	0.3	15.3	29.0	59.2	23.6
	1994-2001	3.8	2.1	15.3	33.5	109.8	22.5
	2002-2008	2.0	0.7	14.9	36.1	70.0	18.6
	2009-2018	0.9	0.5	13.9	35.2	99.2	6.5
Portugal	1961-1974	6.7	0.0	17.9	26.1	50.3	74.1
	1975-1993	3.0	0.7	19.2	29.2	69.5	22.3
	1994-2000	3.7	1.9	17.9	32.7	106.8	19.2
	2001-2008	1.1	-0.1	16.8	33.3	45.7	14.3
	2009-2018	0.2	-0.4	12.0	38.7	20.7	11.8
Spain	1961-1974	7.2	0.5	17.8	29.9	54.0	74.6
	1975-1993	2.2	-0.9	16.3	31.1	34.9	39.0
	1994-2008	3.4	2.9	17.9	36.4	203.6	9.2
	2009-2018	0.4	-0.7	13.5	39.8	21.9	14.8
Sweden	1961-1975	4.0	-0.3	20.9	33.1	46.2	41.0
	1976-1993	1.3	0.0	18.0	35.3	50.9	14.6
	1994-2000	3.7	1.1	14.6	40.2	63.7	40.0
	2001-2007	3.0	0.5	16.0	39.1	56.7	33.3
	2008-2018	1.7	1.1	16.6	38.0	104.6	10.0
United Kingdom	1961-1973	3.5	-0.7	14.2	35.0	42.2	57.6
	1974-1992	1.9	-0.3	15.9	36.0	43.6	26.9
	1993-2000	3.4	0.8	12.6	39.4	60.6	44.0
	2001-2007	2.8	0.7	12.4	35.6	65.5	34.1
	2008-2018	1.1	0.9	11.5	34.4	194.9	5.1
USA	1961-1973	4.3	1.6	15.5	32.6	80.7	34.3
	1974-1991	2.8	1.5	15.8	34.3	101.6	17.5
	1992-2000	3.8	1.9	15.0	35.1	91.8	28.0
	2001-2007	2.5	0.3	15.6	36.1	56.2	28.7
	2008-2018	1.6	0.6	13.9	38.9	69.6	16.4