Why has the Cuban Economy Grown so fast since the Mid-1990s?[1]

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December 2015

This paper tries to answer the following question: if Cuba's workforce has stagnated, if the country's investment to GDP ratio is one of the lowest in the world, and if total factor productivity growth has been miserable, why has the Cuban economy expanded so rapidly since the country emerged from its post-Soviet doldrums? A few numbers illustrate the question: in 2012 real fixed capital formation in Cuba was a measly 12% of GDP; the population of working age and the labor force had increased at annual rates of far less than 1% since 1994; and every econometric and anecdotal evidence suggested that total factor productivity (TFP) growth had been very low or zero. So how is it that the Cuba's real GDP increased continuously from 1994 to 2012 at an average annual rate of 4 ½ %?

The short answer is that in 1994, at the end of the dramatic post-Soviet contraction, the country still had considerable unused labor and capital resources and that, over the following 18-year period, it used these resources with ever greater intensity[2].

1. Accounting for growth

Table 1 shows the results of a growth-accounting exercise for the period 1994-2012, based on a Cobb-Douglas production function with a capital elasticity of output of 0.50. (The exact definition of all the variables used in the paper is provided in the Annex). From 1994 to 2012,

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[1] I am most grateful to Roger Betancourt for his comments on a previous draft. Remaining errors are of course mine.

[2] Another, probably smaller, part of the answer is that numbers in the social services sector occasionally have been cooked to show higher than actual growth. For example, Mesa-Lago and Pérez-López (2009) objected to the argument of Cuban officials that GDP had to be revalued because health and education services in Cuba are supplied to the population for free. I have also noted in my 2013 article that, according to Cuban statistics, the growth of real GDP in health and social services in 2005 was a whopping 51%--obviously an outrageous exaggeration, even taking into account the increase in exports of health professionals to Venezuela in that year. It should also be stressed that Cuban GDP data are severely distorted by the use of a 1:1 exchange rate to convert US$ figures into pesos.

capital accumulation and increased utilization of the existing capital stock accounted for 25% and 30% of total output growth, respectively. The expansion of **active employment** explained approximately 32% of the total, of which 21% represented the shift from redundant to active employment and the remaining 11% came from the growth in active employment. The estimated contribution of **residual growth** (*alias TFP*) was only 13%.[3] The approach used in this paper differs from that of previous growth exercises in that it relies on the concept of *active employment* which excludes hidden employment in the state sector (all workers in the private sector are assumed to be active). This approach has far-reaching quantitative consequences: as indicated in Table 1, the rise in the *utilization* of the labor input accounted for one fifth of the total contribution to growth.

Table 1. Cuba: Contributions to the Growth of Real GDP, 1994-2012

	Contributions to output growth of:	Average annual percentage rate (%)	Percent of total contribution	Formula
	Real GDP	**4.51**	**100**	$\%Y$
1=1a+1b	**Utilized Capital**	**2.48**	**55.0**	$\beta\,\%K_u$
1a	Accumulation of capital stock	1.13	25.1	$\beta\,\%K$
1b	Capital utilization rate	1.35	29.9	$\beta\,\%(E^*/F^*)$
2=2a+2b	**Active employment**	**1.43**	**31.6**	$(1\text{-}\beta)\,\%E^*$
2a	Total employment (state & non-state)	0.50	11.0	line 2 - line 2b
2b	Labor utilization rate	0.93	20.6	$(1\text{-}\beta)\,\%(E_s^*/E_s)\cdot(E_s^*/E)$
3=1-2	**Residual (TFP)**	**0.60**	13.4	$\%Y - \beta\,\%K_u - (1\text{-}\beta)\%E^*$
	memorandum:			
1b+2b	resource utilization	2.28	50.5	
	Output elasticity of capital (β)	0.50		

Sources and methods: See Annex. Y is real GDP, and K and K_u are the actual and utilized levels of the capital stock respectively. E and E* are the actual and active levels of employment. *%( )* is the percentage change operator.

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[3] This confirms anecdotal evidence as well as the results of various quantitative studies. See, for example, Hernández-Catá (2013) and Madrid-Aris (1998 and 2002).

Two observations are in order regarding the results presented in Table 1.

- o First, a very rough, and probably conservative, adjustment for the overstatement of output in the health sector in 2005 implies that real GDP growth in 1994-2012 may have averaged 4.1% per annum instead of 4.5% reported in the official statistics. If that had been the case, residual growth for the sample period would have been just under 5% of total GDP growth instead of the 13% reported in the Table 1.

- o Second, if the rates of utilization of capital and labor were to level off over the medium term, the annual rate of real GDP growth would average roughly 2¼%, which would certainly be a disappointment, including to authorities.

2. Why has active employment increased so rapidly?

We now turn to the question of why the growth of active employment has been so much higher than the growth in population and labor force.

- ➢ As shown in Table 2, the increase in the ***working age population*** was indeed close to zero from 1994 to 2012, reflecting both the slow growth and the aging of the total population.

- ➢ ***Labor force*** growth was a little higher because the participation rate (the ratio of labor force to working age population) rose sharply during most of the sample period, following a steep fall during the post-Soviet contraction. The increase in participation during the sample period reflected in part the decline in the number of discouraged workers[4]; regression results suggests that this decline was associated with an

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[4] The difference between the population of working age and the labor force has two components: (i) the number of people that are permanently outside the workforce, which is determined exogenously by demographic and sociological conditions; and (ii) the number of discouraged workers, a cyclical variable for which there is no published information. In table 2, that number was estimated by subtracting the actual labor force from the potential labor force, which was calculated by multiplying the population of working age by the peak level of the participation rate, which occurred in 1989.

increase in real wages during that period, following a dramatic fall during the 1989-93 contraction. The results also indicated that the number of discouraged workers was negatively correlated with average real private earnings and positively correlated with real per-capita pension receipts (see Hernández-Catá, 2016).

➢ **Employment** increased a little faster, reflecting in part the decline open unemployment associated with the economic expansion.

➢ Most importantly, **active employment** increased much more rapidly than total (published) employment because of the fall in disguised unemployment in the state sector.

Table 2. Population, Labor Force and Employment

	Annual percentage Change, 1994-2012	Thousands of workers 1994	2012
Population of working age (*N*)	0.15	6659	6845
Potential labor force *(F*)*	0.15	5074…………5216	
Labor force *(F)*	0.68	4496	5078
Employment *(E)*	0.87	4159	4902
Active employment *(E*)*	3.15	2642	4576
(State sector)	*(2.69)*	*(2112)*	*(3425)*
(Non-state sector)	*(3.34)*	*(669)*	*(1218)*

Sources and methods: See Annex. Active employment is total employment (state, private and cooperative) minus hidden unemployment in the state sector.

3. Measuring hidden unemployment

The existence of disguised or hidden unemployment in the state sector has been a characteristic feature of the Cuban economy for decades. Since there is no published data on hidden unemployment, this variable was estimated on the basis of the subsidies provided by the Cuban government to state enterprises in order to keep open unemployment low—an ancient communist preoccupation. The methodology used can be summarized as follows.

The profit maximizing condition for a *state enterprise that does not receive subsidies* is the familiar equality between the marginal product of labor and the after tax real wage rate, i.e.
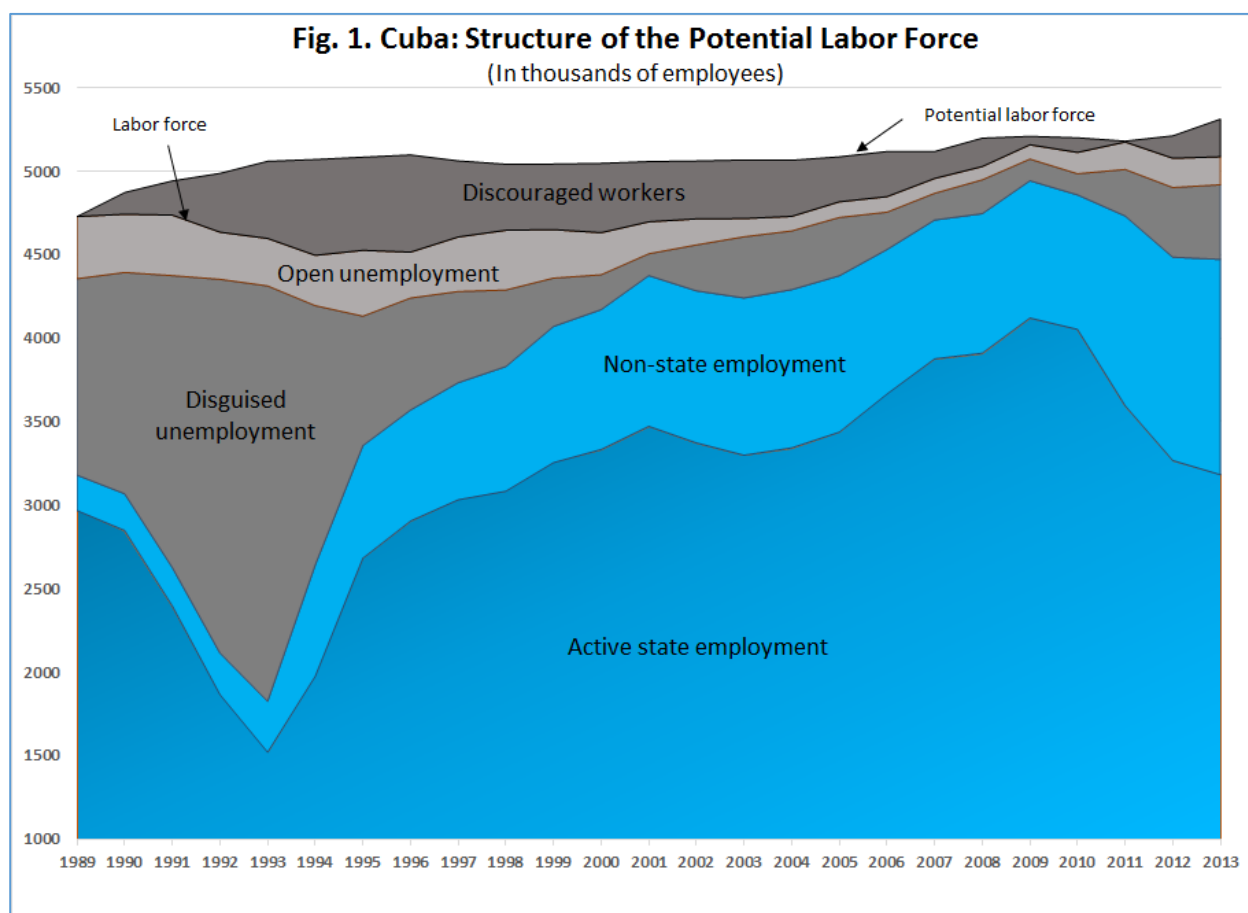
$$\alpha \, y \, / \, E_s^* \; = \; (w + \tau) \, / \, p$$

where E_s^* is the level of active state employment, α is the elasticity of output with respect to labor, y is output, p is the price level, w is the wage rate, and τ is the payroll tax rate.[5] Similarly, the profit maximizing condition for *an enterprise that receives a subsidy ϕ* on condition of avoiding layoffs is:

$$\alpha \, y \, / \, E \; = \; (w + \tau - \phi) \, / \, p$$

Dividing the first equation by the second yields:

$$E_s^*/E_s \; = \; (w + \tau - \phi) \, / \, (w + \tau)$$

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[5] The derivation of this formula is explained in detail in Hernández-Catá (2015a). The formula used in this paper is more complete because it incorporates the effects of payroll taxes which include the social security tax and the "tax on the use of the labor force".

Fig. 1. Cuba: Structure of the Potential Labor Force
(In thousands of employees)

Labor force

Potential labor force

Discouraged workers

Open unemployment

Non-state employment

Disguised unemployment

Active state employment

1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Active state employment (E_s^*) can be calculated on the basis of this equation since all the right-hand side variables are observable. Hidden unemployment is, of course, the difference between total and active state employment $(E–E^*)$.[6]

As shown in Fig. 1, hidden unemployment surged in 1989-93 as the government boosted subsidies in a misguided effort to avoid a surge in open unemployment following the elimination of Soviet/Russian assistance. Subsidies were slashed as part of the far-reaching stabilization plan of 1994; and since then they have been on a downward trend. In line with this policy change, estimated disguised unemployment fell steadily after 1994. This decline was the major reason for the rapid growth of active employment after 1994. Active job growth was boosted more directly in 2011-14 through the transfer of a large number of state employees to the private sector. During that 4-year period, state employment was cut by almost 600 thousand (roughly 16% of the state workforce). Virtually all of that drop was absorbed by a rise in non-state (mostly private) employment. There was little change in open unemployment, but

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[6] Non-subscripted variable apply to the whole economy which comprises the state, private and cooperative sub-sectors The private sector includes the self-employed, individual private farmers, Cooperatives of Credit and Services (CCS), and a residual category that includes foreign enterprises, associations, and salaried private workers.

the estimated number of discouraged workers rose—probably because some of the employees released from the state sector had difficulties in finding an adequate job in the private sector and decided to leave the labor force, at least temporarily. The effect of the rise in discouraged workers on the labor force was more than offset by a sudden and unusual increase in the population of working age—an increase that is hard to comprehend in view of the trend toward stagnation and aging of the Cuban population.

4. Unemployment rates and the measurement of economic slack.

The behavior of the various measures of employment was reflected in sharp differences in the evolution of alternative concepts of the unemployment rate. This is illustrated in Table 3 which contrasts several measures of joblessness. The table features:

- Two versions of the <u>open</u> unemployment rate: u_0 and u_0' using the actual and the potential labor force in the denominator, respectively.

- An <u>adjusted</u> unemployment rate u_1 which adds to the numerator an estimate of discouraged workers (workers that are not currently looking for a job but can be quickly induced to rejoin the labor force if real wages are sufficiently attractive).

- An <u>effective</u> jobless rate u_2, which also includes an estimate of hidden unemployment in the numerator.

Table 3 illustrates how severely the evolution of labor market slack can be misjudged by focusing on the published (open) jobless rate and ignoring changes in the participation rate and hidden unemployment.

	Table 3. Cuba: Alternative Versions of the Unemployemnt Rate (In percent of the potential labor force)[a]	1994	2011	2012	2013
u_0	Open unemployment rate	6.7	3.2	3.5	3.3
u_0'	Open unemployment rate	4.2	2.3	2.4	2.3
	plus: rate of discouraged workers	9.0	0.4	2.3	3.6
u_1	Adjusted unemployemnt rate	13.1	2.7	4.7	5.9
	plus: disguised state unemployment rate	24.6	2.3	2.3	2.3
u_2	Adjusted effective unemployment rate	37.7	5.0	7.0	8.2

Sources and methods: See Annex.

5. The effect of changes in labor force participation.

Cuba's participation rate (the ratio of the labor force to the population of working age) and its employment rate (the ratio of employment to the labor force) have fluctuated widely over the past 2 ½ decades, falling abruptly during the immediate post-Soviet period and rising sharply thereafter. Unpublished empirical results[7] suggest that these fluctuations have reflected largely changes in real earnings in both public and private sectors, with pension payments and the gender composition of the labor force also playing a role.

As noted above, the difference between the population of working age *(N)* and the labor force *(F)* includes an exogenous structural component *(N-F*)* determined by demographic factors and individual's preferences; and a cyclical component *(F*-F)* –i.e., discouraged workers—that is inversely related to real earnings. The strong cyclicality of this component suggests that workers in Cuba have a tendency to move in and out of the labor force when real earnings move up or down, just as they tend to move from employment to open unemployment. For this reason, an unemployment rate variable that includes discouraged workers in the numerator is

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[7] Hernández-Catá (2016)

likely to be a better indicator of the number of workers that are currently jobless but are potentially available to join the ranks of the employed, whether or not these workers claim to be actively looking for a job and are therefore included in the labor force

6. Is the end of the game approaching?

The predominant role played by increased resource utilization is illustrated in Fig. 2. The gap between actual and potential GDP, which had widened dramatically following the end of Soviet/Russian assistance and the deep economic contraction that followed, narrowed continuously from 1994 to the mid-2000s, as the economy expanded. The gap narrowed sharply from 2005 to 2008 as growth accelerated in the context of large scale Venezuelan investments and subsidies on Cuban oil imports. But the economy was hit by a severe financial crisis in 2008 when a loose macroeconomic policy aggravated by a drop in the world price of nickel and three destructive tropical hurricanes resulted in unusually large fiscal and current account deficits and to serious external payments difficulties.

Fig. 2. Actual and Estimated Potential GDP
(In millions of 1997 dollars)
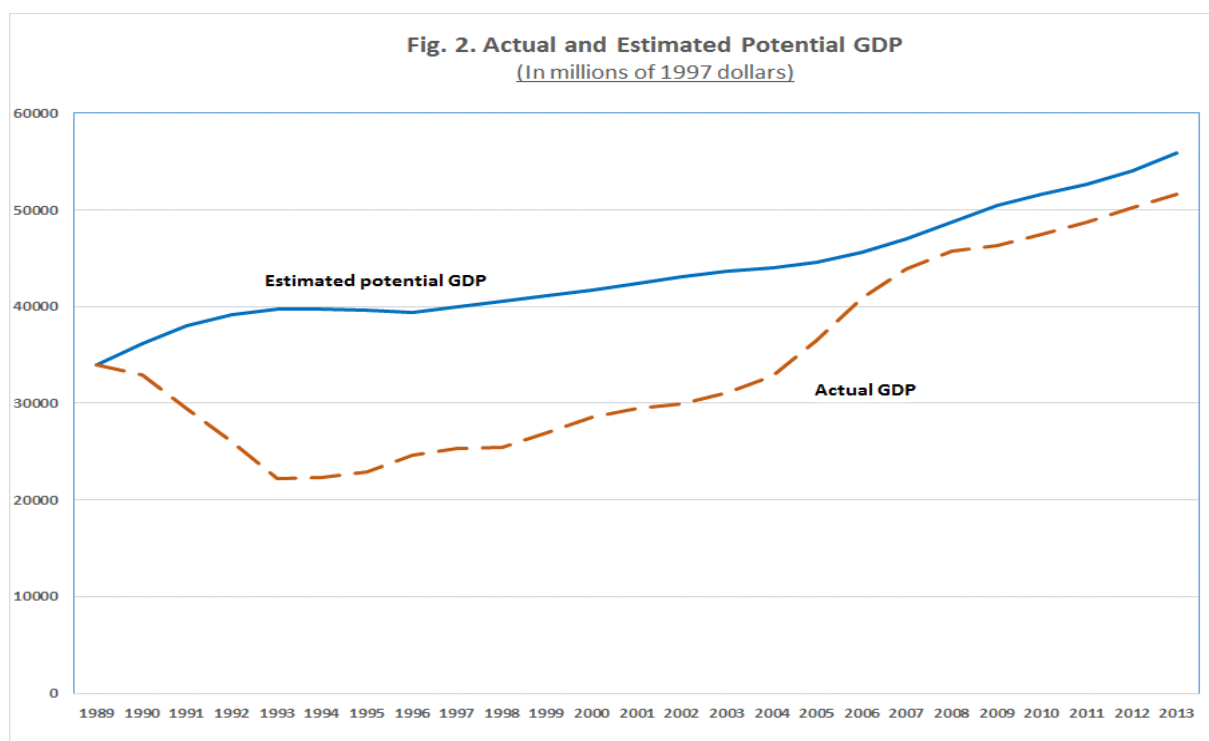
Sources and methods: See Annex.

Since then the gap has widened only slightly because of the appropriately restrained fiscal and wage policies adopted by the Raul Castro administration after the financial crisis of 2008, which was accompanied by substantial wage restrained and moderate growth of the money supply. How much room is now left for growth fueled by expansion of aggregate demand is difficult to say because the *level* of the output gap is influenced by its initial (1989) value of TFP, which is arbitrarily determined. The experience of 2008 suggests however, that another period of rapid expansion of demand would involve a serious risk of overheating. The substantial relaxation of macroeconomic policy that occurred in 2014 is therefore of concern

Another sign of trouble is the anecdotal evidence suggesting that many qualified state employees are quitting the government sector to work as taxi drivers, restaurant employees or even farmers, complicating the government's task to enforce regulations (not necessarily a calamity in all cases) and to manage its tax enforcement and statistical gathering tasks. To be sure, these developments are in part the direct result of the policy-determined transfer of employees from the state to the private sector. But they seem to go beyond that and reflect the growing differential between earnings in the private and government sectors. The unusually large increase in government wages in 2014, following a period of very modest increases, could well indicate the government's preoccupation with this problem. In any event, the economy appears to have entered a period of labor scarcity which is another indication that the economy is approaching a situation of full employment.

7. Conclusion: good and bad news

The conclusion of this paper is that Cuban economic growth since the end of the post-Soviet contraction has resulted mostly from increasing utilization of labor and capital resources. This result is good news in the sense that it is possible to find a rational explanation to the rapid and uninterrupted growth of the Cuban economy since 1994. It is not so good news in the sense that relying on increasing utilization of resources to boost output is a game that cannot be played forever.

Hidden unemployment has been falling steadily since 1994 owing to the decline in subsidies for enterprise losses and the recent large scale transfer of workers from the state to the private sector. Moreover the participation rate has moved up rapidly through the late 1990s and 2000s. As a result, the *effective* unemployment rate is estimated to have dropped by about 30

percentage points from 1994 to 2012, while the open unemployment rate was falling by only 5 ½ percentage points (see Table 3). Thus the degree of labor market slack has been absorbed at a much faster pace than would be indicated by the official unemployment rate, because hidden unemployment in the state sector has plummeted and the number of discouraged workers has dropped. At the same time, the rate of utilization of the capital stock has increased substantially.

Of course, the calculations underlying these conclusions are by no means precise, and the results are sensitive to the choice of parameters such as the labor share, the rate of depreciation of capital, and the link between existing and utilized capital. Moreover there is uncertainty about the *level* of the output gap, and therefore there may be a little more room to absorb slack without running into trouble. But the main conclusion is robust. Sooner or later the degree of utilization of labor and capital will reach a limit, and pressures on the external current account deficit will re-emerge (as happened in 2008), threatening price stability and the sustainability of the fixed exchange rate. Unless, that is, there are further transfers of redundant state workers, private employment is seriously liberalized, investment is substantially increased, and rapid exchange-rate unification improves resource allocation and the competitive position of Cuban producers.

Annex: Definition and Sources of key Variables.

Real GDP *(Y)* from *Oficina Nacional de Estadística e Información (ONEI)* various issues.

Capital stock *(K)* is obtained by accumulating over time real investment net of depreciation. The rate of depreciation is assumed to be 5 1/2% per annum.

The **capital utilization rate** $U_k = K_u/K$ *is assumed to be equal to* the labor utilization rate U_L =E*/E.

Discouraged workers *(N-F*)* are measured by the difference between the potential and the actual labor force.

The **elasticity of output with respect to capital** *(ß)* is taken to be 0.5. This is a little lower than the ratio of labor compensation to GDP (at factor cost) indicated by Cuban statistics, which has averaged around 0.55 in 2009-12. But this ratio probably underestimates the labor share because of incomplete coverage of the underground economy.

Total employment *(E)* includes state employment (both active and inactive) and non-state employment (private and cooperative).

The derivation of **active state employment** (E_s^*) is explained in section 2 of this paper. The formula is based on two profit maximizing conditions: for enterprises that receive government subsidies and for those that do not.

Total active employment *(E*)* is defined as total employment minus hidden unemployment in the state sector. Alternatively, E* can be defined as the sum of active employment in the state sector plus non-state employment.

Hidden unemployment $(\hat{U}=\hat{U}_s)$ is the difference between total state employment E_s and active state employment E_s^*.

The **payroll tax rate** *(τ)* is calculated as the sum of social security contributions and taxes on the use of the labor force by enterprises, divided by total employment. Following Pérez (2000) we assume that enterprises pay 5/17 of all social security contributions (a simplification of a more complex actual scheme) and 100% of the taxes on the use of the labor force.

Potential GDP is calculated on the basis of a linear-homogeneous Cobb-Douglas production function using: (i) the actual (as opposed to the effectively utilized) capital stock; and (ii) the potential (as opposed to the actual) labor force; and the rate of TFP growth give in Table 1.

The **potential labor force** *(F*)* is calculated as the conventionally defined labor force *(F)* evaluated at the peak level of the participation rate.

The **subsidy rate** *(ϕ)* is calculated as the value of state subsidies to cover enterprise losses *(transferencias a empresas por perdidas* in the terminology of the *Oficina Nacional de Estadística e Información)* divided by the number of state employees. Data on these subsidies were published by ONEI until 2012, but publication was discontinued thereafter.

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