N° 2002 – 14
novembre

CEPII
CENTRE
D'ÉTUDES PROSPECTIVES
ET D'INFORMATIONS
INTERNATIONALES

When are structural deficits good policies ?

Jean Chateau

When are structural deficits good policies ?

Jean Chateau

No 2002 – 14
novembre

Table of Contents

Abstract

This paper analyses the marginal allocative and welfare effects of various structural budget-deficits in a representative-agent model where the Ricardian equivalence Theorem does not hold because of distortionary taxation. In order to carry out this analysis we perform numerical examples based upon a parameterized "typical" European economy. The paper shows that temporary and partially income tax-cuts like public investment spending deficits may correspond to welfare-enhanced and self-financed policies. However, for plausible range of parameters and tax rates deficit-financed public investment policies may actually be self-financed whereas *dynamic Laffer curves* seem to be ruled out for tax cuts policies.

Résumé

Ce document analyse les effets marginaux de plusieurs politiques alternative de déficits publics struturels sur les variables macroéconomiques et le bien-être dans le cadre d'un modèle simple à agent représentatif où le *Théorème de l'équivalence Ricardienne* n'est pas valide du fait de la présence de taxes distorsives. Cette analyse s'appuie sur des simulations numériques du modèle étalonné de façon à reproduire les caractéristiques d'une économie Européenne type. Ce papier montre que les déficits temporaires qu'ils soient consécutifs à des baisses des taux d'imposition ou résultent d'une hausse temporaire de l'investissement public peuvent être non seulement des politiques bénéfiques mais peuvent aussi être auto-financés. Cependant, pour des valeurs plausibles des paramètres et des taux de taxes initiaux seules les politiques de hausse de l'investissement public peuvent raisonnablement faire apparaître des phénomènes d'autofinancement ; les déficits résultants de baisses d'impôts quant à eux ne peuvent être caractérisés par des *courbes de Laffer dynamique*.

J.E.L. classification number: D9, E62, H4, H6.

Keywords: Deficit Finance, Public Capital, Distortionary Taxation, Intertemporal Choice.

Mots Clés : Deficit budgétaire, Capital Public, Fiscalité distorsive, Choix Intertemporels.

Summary

In the recent years European countries seem to undertook some kind of structural budget of fiscal reforms most of them were done under budget deficit. This paper is aimed at determining when these two kind of deficit financed policies should be recommended. Two majors questions relies to this problem. First, can a permanent taxcut or a permanent government investment increase be selffinanced, in the sense that the implied higher revenues suffice to retire debt without a future tax or fiscal adjustment? And second, if the answer is negative, has the overall policy be welfareimproving in spite of the adjustment required for keeping budget in intertemporal balance?

This paper is a contribution to the controversy about the effects of deficits when Ricardian Equivalence does not hold. More precisely it deals with macroeconomic and welfare effects of marginal deficit-financed policies within a model built in failure of this theorem by imposing distortionary income taxation. Studies based on simple neoclassical Representative-Agent models point out that distortionary tax-cuts may though stimulate economic growth in the short and in the medium run through capital accumulation, through increase in labor supply or through these two channels. Here we also assume that government purchases are partly devoted to productivity-enhancing expenditures, trough a public capital stock. So the debate should then not be about the relevance of tax-cuts but rather about which, between tax-cut and government spending increase, corresponds to a better policy.

We perform various quantitative analysis of marginal policies thanks to numerical simulations of a model parameterized as to replicate a “typical" or aggregate European economy. We then show that deficit-financed marginal increases in public investment could present either “Keynesian like" or “anti-Keynesian like" features according to the way the public capital stock is assumed to be built. More precisely, this policy may sufficiently stimulate the economy to imply welfare benefits if the wedge between the relative size of public capital in the economy and its relative productivity is not very important. Moreover, self-financing phenomena are very plausible for this policy, in the sense that they occur with reasonable underlying values for the structural parameters and initial taxes. At the opposite, “*dynamic Laffer effects*" associated to general income tax-cut policies are not plausible even though these phenomena cannot be theoretically ruled out.

To understand these effects we also examine, thanks to a precise Hicksian decomposition between substitution and wealth effects, the reaction of the economy to changes in intertemporal prices ensuing from deficit policies. This will allow us to precisely quantify overall substitution effects (sum of contemporaneous and intertemporal substitution effects) in order to discuss about intertemporal substitution mechanisms at the heart of the deficits policies.

J.E.L. classification number: D9, E62, H4, H6.

Keywords: Deficit Finance, Public Capital, Distortionary Taxation, Intertemporal Choice.

Résumé Long

Dans les années récentes, les pays européens ont, dans l'ensemble, entrepris de mener à bien des réformes budgétaires et fiscales structurelles, la plupart de ces expériences ayant été menées conjointement avec des déficits. Ce papier a pour objet d'évaluer l'attrait de ces deux types de politique de déficits structurels. Deux questions permettent d'orienter le débat. Est-ce qu'une politique de réduction d'impôts ou de hausse des dépenses d'investissement public peut être suffisamment efficace pour générer d'elle même les recettes fiscales qui permettront de combler l'endettement auquel elle a donné lieu. Dans la négative, est-ce qu'une de ces politiques ne peut pas cependant s'avérer être bénéfique en terme de bien être malgré la nécessité d'envisager un ajustement des soldes nécessaires pour assurer le maintien de l'équilibre intertemporel des comptes publics

Ce papier se place dans le cadre de la controverse théorique relative aux effets des déficits publics lorsque les conditions de l'équivalence Ricardienne ne sont pas remplies. Plus précisément les déficits publics importent ici du fait de la présence de taxes distorsives. Les études basées sur des modèles néo-classiques à agent représentatif indiquent dans ce cadre que des politiques de tax-cut peuvent stimuler la croissance à court et moyen terme au travers soit de la stimulation de l'accumulation privée de capital, soit de celle de l'offre de travail, soit des deux. Ici nous supposons de plus qu'une partie des dépenses publiques est consacrée à la formation d'un stock de capital public permettant d'élever la productivité des facteurs de production privé. La question qui se pose n'est plus réellement celle de la pertinence des politiques de *tax cut* mais bien plutôt de déterminer laquelle de ces deux réformes structurelles est la plus à même d'être financée par emprunt.

Pour évaluer quantitativement les effets de politiques structurelles marginales nous avons simulé le modèle après l'avoir étalonné de façon à reproduire des caractéristiques d'une économie Européenne représentative. Nous montrons alors que des politiques de relance de l'investissement public, financées par emprunt, peuvent ou pas présenter des caractéristiques de moyen terme ressemblant à celles inspirées par des modèles Keynésiens, selon la façon dont on suppose que les dépenses d'investissement public influencent la production privée. Plus précisément, une telle politique peut stimuler suffisamment l'économie pour impliquer des bénéfices en matière de bien-être dès lors que l'écart entre le montant relatif de capital public et sa productivité relative est assez faible. On montre de plus, que des phénomènes d'auto-financement d'une telle politique apparaissent plausibles (au regard de la valeur des paramètres). En revanche, ce type de "*courbe de Laffer dynamique*" dans le cas de politique de *tax cut* est, quant à lui, peu vraisemblable même si on ne peut l'éliminer du point de vu théorique.

Pour comprendre les effets à l'œuvre nous nous appuyons sur une décomposition Hicksienne précise entre effet richesse, effets substitution contemporains et effets substitution intertemporels induits par les variations des prix intertemporels consécutives aux politiques de déficit.

Classification JEL : D9, E62, H4, H6.

Mots Clés : Deficit budgétaire, Capital Public, Fiscalité distorsive, Choix Intertemporels.

When are structural deficits good policies?[1]

Jean Chateau[2]

1. INTRODUCTION

In the last two decades of the twentieth century the slow pace of economic growth and the costs of economic integration have put strong pressure on European government budgets. During this period governments have completed large cuts in public investment spending and have postponed tax reforms. Due to the recent upswing in economic growth and the improvements of fiscal balance asked by the EMU construction, the European countries may once again undertake deficit financed of such structural reforms. Resorting to borrowing to finance structural policies is indeed justified even in a growth context[3] as long as it shifts burden of spending payments to the time where the policies imply benefits. In this paper, economic reaction lags to marginal income tax-cuts or to government productive capital projects justify borrowing finance. More generally this paper is aimed at determining when these two kind of deficit financed policies should be recommended. Answers to this allocative efficiency problem are based upon two considerations. First, can a permanent tax-cut or a permanent government investment increase be self-financed, in the sense that the implied higher revenues suffice to retire debt without a future tax or fiscal adjustment? And second, if the answer is negative, has the overall policy be welfare-improving in spite of the adjustment required for keeping budget in intertemporal balance?
To deal with such concerns the dynamic effects of structural budget deficits on economic variables have to be fully characterized. The existing literature gives us some elements about these effects. Barro (1974) has shown that if households were perfectly altruistic and had perfect foresight, a temporary substitution of debt to lump sum taxation in order to finance a given path of government spending would have no real economic effects as long as the government intertemporal budget constraint is satisfied. After Barro's work, a theoretical controversy has focused on the relevance of “Keynesian" effects (Blinder and Solow 1973) or more generally on any justifications for deficit policies when some of this *Ricardian equivalence Theorem* assumptions were not met any longer (see Barro (1989) for details). This paper is along these lines in dealing with macroeconomic and welfare effects of marginal deficit-financed policies within a model built in failure of this theorem by imposing distortionary income taxation.
Such a disincentive taxation scheme allow us to deal with the relevance of the supply-side economic prescription that governments have to lower tax rates irrespective of

[1]I wish to thank A. d'Autume, X. Fairise, J.Glachant, seminar participants at the 1997 E.S.E.M. congress in Toulouse for helpful comments on an earlier version of this paper. I also thank J.P. Drugeon for his meticulous readings of this paper. Correspondence : chateau@cepii.fr.

[2]CEPII (9, rue Georges Pitard, 75740 Paris Cedex 15, France).

[3]Here, we do not deal here “automatic stabilization" principles that insist on retirement of outstanding government debt during business-cycle booms.

the consequences for the budget. The existing literature does not seem to corroborate such an intuition: as a matter of fact, it does not deal either with directions of welfare-improving reforms. Nevertheless studies based on simple Representative-Agent (R.A.) models point out that distortionary tax-cuts may though stimulate economic growth in the short and in the medium run through capital accumulation (Judd 1987), through increase in labor supply (Barro 1989) or through these two channels (Trostel (1993) and Ludvingson (1996)). With such a R.A.-model we show that tax-cut policies would generally be welfare-improving, at least for sufficiently elastic labor supply. The debate should then not be about the relevance of tax-cuts but rather about which, between tax-cut and government spending increase, corresponds to a better policy. Though Judd (1985) has focused on government expenditures changes and deficits, his analysis remains unsatisfactory for our concern because government spending is considered as “useless". In opposition to this, as in numerous empirical (Aschauer 1989) or theoretical (Baxter and King 1993) studies on economic growth, we assume that government purchases are partly devoted to the building of a public capital stock that enhance the global productivity.

We then show that deficit-financed marginal increases in public investment could present either “Keynesian like" or “anti-Keynesian like" features according to the way the public capital stock is assumed to be built. More precisely, this policy may sufficiently stimulate the economy to imply welfare benefits if the wedge between the relative size of public capital in the economy and its relative productivity is not very important. Moreover, self-financing phenomena are very plausible for this policy, in the sense that they occur with reasonable underlying values for the structural parameters and initial taxes. At the opposite, “*dynamic Laffer effects*" associated to general income tax-cut policies are not plausible even though these phenomena cannot be theoretically ruled out.

As stressed by Trostel (1993)’s intuitive explanations it is not easy to understand how the economy responds to deficits (two-steps) policy. We then also examine, thanks to a precise Hicksian decomposition between substitution and wealth effects, the reaction of the economy to changes in intertemporal prices ensuing from deficit policies. This will allow us to precisely quantify overall substitution effects (sum of contemporaneous and intertemporal substitution effects) in order to discuss about intertemporal substitution mechanisms at the heart of the deficits policies.

The paper is structured as follows. Section 2. presents the framework, the simulation method and the calibration. The quantitative analysis of marginal policies will be done under a parameterization which specified to replicate a “typical" or aggregate European economy[4]. Section 3. briefly discusses the macroeconomic impacts of income tax-cut deficit policies. Section 4. analyses effects resulting from various deficit experiments based on productive government expenditure increases.

[4]Even though Europe is far from being a single integrated economy as the USA, the E.M.U. and the Stability and Growth Pact, allow us to consider without too much loss of information Europe as a whole.

2. MODELING STRUCTURAL DEFICIT POLICIES IN GENERAL EQUILIBRIUM

Since the model is similar to Trostel (1993), but for the specification of public capital, and since deficit policies are modelled as in Judd (1985), both of these elements are briefly recalled (details are available in these contributions). The model stylizes a real and closed equilibrium economy with a representative perfect-foresight agent. There is a single good, whose price is normalized to one, which can be consumed or invested, privately or publicly.

At any time $t \geq 0$, the infinitely-lived household allocates an unit of time endowment between leisure (l_t) and worked hours (L_t). As he works he receives a net-of-tax wage rate $(1-\tau_t)w_t$, where w is the before tax wage rate and τ is the marginal income tax rate. He also perceives income from the return of two perfectly substitutable assets: privately held capital stock (k_t) and government instant maturity bonds (b_t). At the equilibrium gross returns on bonds and on capital, respectively denoted r_t^b and $(r_t^f - \delta)$, with δ the constant rate of capital depreciation, will be equal. $\{tr_t\}_{t \in \mathbb{R}^+}$ is a given path of lump-sum transfer specified merely for calibration purpose. The household uses his current income to purchase consumption good (c_t) or to accumulate assets. At $t = 0$, the agent will choose his consumption-assets accumulation-leisure paths to maximize his welfare function (1) subject to his intertemporal budget constraint (2), taking tax rates, prices and initial wealth (3) as given, with $\rho > 0$ is the individual's rate of time preference :

$$
\begin{aligned}
\max_{\{c_t, l_t, \dot{k}_t, \dot{b}_t\}_{t\in\mathbb{R}^+}} W(0) &= \int_0^{+\infty} e^{-\rho t} U\left(c_t, l_t\right) dt, && (1)\\
\dot{k}_t + \dot{b}_t + c_t &= (1-\tau_t)[(r_t^f - \delta)k_t + r_t^b b_t + w_t L_t] + tr_t \;, &&\\
\lim_{t\to\infty} b_t e^{-\int_0^t (1-\tau_s) r_s^b ds} &\geq 0\;, \qquad \lim_{t\to\infty} k_t e^{-\int_0^t (1-\tau_s)(r_s^f-\delta) ds} \geq 0\;, && (2)\\
b(0) &= b_0\;, \qquad k(0) = k_0 \;\; \text{given}, && (3)
\end{aligned}
$$

The instantaneous utility function U is assumed to be a strictly increasing, strictly concave and strongly separable function in its two arguments. Let us define μ_t as the marginal value of assets, in terms of consumption. Assuming that an interior solution exists and that the transversality conditions are satisfied[5], the first-order conditions characterizing the household optimization are (time arguments are suppressed when no ambiguity results) :

$$
\begin{aligned}
\mu &= U_c(c), && (4)\\
U_l(l) &= U_c(c)(1-\tau)w, && (5)\\
\dot{\mu} &= \mu[\rho - (1-\tau)(r^f - \delta)] = \mu[\rho - (1-\tau)r^b]. && (6)
\end{aligned}
$$

[5] TVC for both assets are : $\lim_{t\to\infty} U_c(c_t)e^{-\rho t} b_t = 0$ and $\lim_{t\to\infty} U_c(c_t) e^{-\rho t} k_t = 0$.

On the technological side, the representative firm produces gross output y using a standard neoclassical production function : $y_t = F(k_t, L_t, k_t^g)$. Only two inputs, namely private capital and labor, are chosen by the firm, the stock of public capital (k^g) being given and freely provided by the government. $F(\cdot)$ is assumed to be linearly homogeneous in private inputs and **weakly separable** between private inputs and public capital. Competitive behaviour implies that private inputs receive their marginal product at the equilibrium :

$$w = F_L(k, L, k^g), \quad (7)$$
$$r^f = F_k(k, L, k^g). \quad (8)$$

The government levies taxes $\{\tau_t\}_{t\in\mathbb{R}^+}$ and issues new bonds to finance an expenditure path $\{g_t\}_{t\in\mathbb{R}^+}$, tax allowances for depreciation and interest payments on outstanding debt. The whole policy $\{\tau_t, g_t, \dot{b}_t\}_{t\in\mathbb{R}^+}$ is **feasible** :

$$\dot{b} + \tau[r^f k + r^b b + wL] = g + r^b b + \tau\delta k + tr \text{ and } \lim_{t\to\infty} e^{-\int_0^t (1-\tau_s) r_s^b ds} b_t \leq 0, \quad (9)$$

where the last inequality rules out Ponzi-game on government bonds. Government purchases of private good can be used as “consumption expenditures" (c^g) or as “investment expenditures" (I^g, $g \equiv I^g + c^g$). We perform our analysis under two alternative assumptions about the way public investment builds up public capital. First, as in Arrow and Kurz (1970) or Baxter and King (1993), we adopt a conventional law of motion : $\dot{k}^g = I^g - \delta k^g$, where public capital depreciates at the same rate as private capital (**variant 1.**). Second, as in Aschauer (1988) or Barro (1990), we assume that public capital is proportional to public investment[6] : $k^g = BI^g$, B being specified merely for calibration purpose (**variant 2.**). As both variants capture different features of productive expenditures we did not choose among them.

Tax equilibria and deficit policies

Definition : *Given a public policy $\{\tau_t, g_t, \dot{b}_t\}_{t\in\mathbb{R}^+}$ satisfying (9), and initial assets (k_0, b_0), a competitive tax-equilibrium is a set of paths for factor prices and an allocation $\{\dot{b}_t, \dot{k}_t, l_t, c_t\}_{t\in\mathbb{R}^+}$, such that : household maximizes (1) subject to (2), factor prices satisfy (7)-(8) and markets clear at each period.*

From this definition, tax-equilibria are driven by the following system :

$$\begin{aligned} \dot{\mu} &= [\rho - (1-\tau)(F_k(k, L, k^g) - \delta)]\mu, \\ \dot{k} &= F(k, L, k^g) - \delta k - c - g, \end{aligned} \quad (10)$$

[6]This peculiar specification means that some current government expenditure may enhance total factor productivity. For instance, order and law services provided by government are much more of this kind than from capital stock services.

together with (4)-(5) and (2). From *Walras' Law* government constraint is also satisfied and (9) will permit us to determine the path of bonds holdings.

The paper is aimed at analysing quantitative effects of two kind of deficit policies : tax-cuts or government investment increases. For tractability we consider linear local approximations of equilibrium paths around an initial steady-state characterized by time-to-time budget balance. We suppose that the government announces at time $t = 0$ a two-steps (unexpected) reform :

$$\tau_t = \bar{\tau} + u^{\tau} h^{\tau}(t) \text{ and } I^g(t) = \bar{I}^g + u^{Ig} h^{Ig}(t), \tag{11}$$

where u are marginal shocks on the instruments and with the following time-path of changes in both instruments :

Tax-cut : $h^{\tau}(t) = \begin{cases} -1 & \text{for } 0 \leq t < T \\ \xi & \text{for } t \geq T \end{cases}$, $h^{Ig}(t) = 0$ for all $t \geq 0$

Increase in I^g: $h^{\tau}(t) = \begin{cases} 0 & \text{for } 0 \leq t < T \\ \xi & \text{for } t \geq T \end{cases}$, $h^{Ig}(t) = \begin{cases} 1 & \text{for } 0 \leq t < T \\ 0 & \text{for } t \geq T \end{cases}$

In (11) the tax-cut (or the spending rise) is implemented at time $t = 0$ and lasts until time $t = T$. At this date we assume that taxes are permanently adjusted in order to balance the intertemporal government budget[7]. As this was already the case for the temporal profile of the reform, the size ξ of this subsequent adjustment is perfectly anticipated by the rational agent: he knows that ξ is endogenously determined in order to satisfy (9). According to the effect of the policy on the economy and on the tax bases, ξ could be positive or negative; in the later case we will refer to this policy as being *self-financed*.

In a second step, we substitute (11) in the system (10), making explicit the dependence on constant marginal shocks u. Differentiating with respect to u around the initial steady-state yields the following stable system of differential equations (circumflex indicate percentage changes in variables) :

$$\begin{pmatrix} \dot{\hat{\mu}}_t \\ \dot{\hat{k}}_t \end{pmatrix} = J \cdot \begin{pmatrix} \hat{\mu}_t \\ \hat{k}_t \end{pmatrix} + \Psi \cdot \begin{pmatrix} u^{\tau} h^{\tau}(t) \\ u^{Ig} h^{Ig}(t) \end{pmatrix} + \Gamma\, \hat{k}^g(t), \tag{12}$$

where

$$J = \frac{1}{\alpha} \begin{pmatrix} -\eta\theta_L(1-\bar{\tau})F_k & \theta_L(1-\bar{\tau})F_k \\ \frac{F_k}{\theta_k}(\eta\sigma\theta_L + \epsilon\alpha\theta_c) & \alpha(F_k - \delta) + \eta\theta_L F_k \end{pmatrix},$$

$$\Psi = \begin{pmatrix} F_k - \delta + \frac{\eta\theta_L F_k}{\alpha} & 0 \\ -\frac{F_k\eta\sigma\theta_L}{\alpha\theta_k(1-\bar{\tau})} & -\frac{F_k}{\theta_k y} \end{pmatrix}, \Gamma = \frac{\epsilon_g}{\alpha} \begin{pmatrix} -(\sigma+\eta)(1-\bar{\tau})F_k \\ \frac{F_k}{\theta_k}(\eta\sigma\theta_L + \alpha) \end{pmatrix},$$

[7] Debt repayment could also be carried out by changes in the government spending but since this does not seem practical from an historical perspective we have not consider it.

ϵ and η being the intertemporal elasticities of substitution (in absolute value) of consumption demand and labor supply ; θ_L, θ_k, θ_I, θ_c, θ_{cg} and θ_{Ig} are respectively the steady-state shares of gross output going to labor income, to gross capital income, to private gross investment, to private consumption, to government consumption and to government investment ; σ is the elasticity of substitution between private inputs in gross output ; ϵ_g is the elasticity of output to public capital ; for notational convenience we also define $\alpha = \eta\theta_k + \sigma$. The solution of (12) for a tax-cut deficit is being given by Trostel (1993), we only report the solution for productive spending deficits in appendix.

Comparative dynamics of household plan

As deficit policies are rather complex the resulting changes in economic variables are difficult to interpret. King (1991) gives a useful method to understand dynamic properties of general equilibrium models. It consists, according to *Hicksian* principles, to decompose between income and substitution components the equilibrium variations of the household plan in response to changes in the intertemporal prices. We therefore define intertemporal (discounted) prices of consumption and labor, respectively $p_t^c = e^{-\int_0^t (1-\tau_s) r_s^b ds} = e^{-\rho t}\mu_t/\mu_0$ and $p_t^L = (1-\tau_t) w_t p_t^c$. Substituting these expressions in (2), (4) and (5), then differentiating gives us :

$$\begin{aligned}
\hat{c}_t &= -\epsilon(\hat{\mu}_0 + \hat{p}_t^c), && (13)\\
\hat{L}_t &= \eta(\hat{\mu}_0 + \hat{p}_t^L), && (14)\\
\int_0^\infty e^{-\rho s}(\bar{\theta}_c \hat{c}_s + [\bar{\theta}_c - \bar{\theta}_{tr}]\hat{p}_s^c) ds &= (1-\bar{\tau})\bar{\theta}_L \int_0^\infty e^{-\rho s}(\hat{L}_s + \hat{p}_s^L) ds, && (15)
\end{aligned}$$

eliminating the initial jump $\hat{\mu}_0$, we may obtain the following decomposition of equilibrium consumption demand changes, $\forall t \geq 0$:

$$\begin{aligned}
\hat{c}_t \quad &= -\epsilon \hat{p}_t^c && \text{(current substitution effect of } \hat{p}_t^c)\\
&+ \tfrac{\epsilon\rho\epsilon\bar{\theta}_c}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} \int_0^\infty e^{-\rho s}\hat{p}_s^c ds && \text{(intertemporal subst. effect of } \{\hat{p}_t^c\}_{t\in\mathbb{R}^+})\\
&+ \tfrac{\epsilon\rho\eta\bar{\theta}_L(1-\bar{\tau})}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} \int_0^\infty e^{-\rho s}\hat{p}_s^L ds && \text{(intertemporal subst. effect of } \{\hat{p}_t^L\}_{t\in\mathbb{R}^+})\\
&- \tfrac{\epsilon\rho(\bar{\theta}_c - \bar{\theta}_{tr})}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} \int_0^\infty e^{-\rho s}\hat{p}_s^c ds && \text{(intertemporal wealth effect of } \{\hat{p}_t^c\}_{t\in\mathbb{R}^+})\\
&+ \tfrac{\epsilon\rho\bar{\theta}_L(1-\bar{\tau})}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} \int_0^\infty e^{-\rho s}\hat{p}_s^L ds, && \text{(intertemporal wealth effect of } \{\hat{p}_t^L\}_{t\in\mathbb{R}^+})
\end{aligned}$$

as well as for labor supply changes :

$$\begin{aligned}
\hat{L}_t \quad = \quad & \eta\hat{p}_t^L - \eta\rho\frac{\epsilon\bar{\theta}_c \int_0^\infty e^{-\rho s}\hat{p}_s^c ds}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} - \eta\rho\frac{\eta\bar{\theta}_L(1-\bar{\tau})\int_0^\infty e^{-\rho s}\hat{p}_s^L ds}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})}\\
&+\eta\rho\frac{(\bar{\theta}_c - \bar{\theta}_{tr})\int_0^\infty e^{-\rho s}\hat{p}_s^c ds}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})} - \eta\rho\frac{\bar{\theta}_L(1-\bar{\tau})\int_0^\infty e^{-\rho s}\hat{p}_s^L ds}{\epsilon\bar{\theta}_c + \eta\bar{\theta}_L(1-\bar{\tau})}
\end{aligned}$$

The current substitution effect also corresponds here to a *Frishian* direct and specific substitution effect[8]. The general substitution effects of the variations $\{\hat{p}_t^c\}_{t\in\mathbb{R}^+}$ and $\{\hat{p}_t^L\}_{t\in\mathbb{R}^+}$ operate through $\hat{\mu}_0$ and are thus of an intertemporal nature. The two last components give the overall wealth effects of the policy that can be used to compare desirability of various public reforms. As a matter of fact, it is more convenient to draw this information from welfare incidence calculations given here by Δ_W, the constant relative change in consumption at each date (in terms of consumption good at $t = 0$) required to insure at the previous equilibrium the same welfare than with the new tax-equilibrium allocation ($\Delta_W = \rho\bar{y}\int_0^\infty e^{-\rho s}[\bar{\theta}_c\hat{c}(s) - (1-\bar{\tau})\bar{\theta}_L\hat{L}(s)]ds$).

Calibration

To analyze quantitative effects of deficits we assign values to parameters that characterize tastes and technology as well as initial steady-state variables. The parameterization is made to be consistent with some observed key features of a "typical" European economy. To this extent we have chosen the following shares of output : θ_c = 61 %, θ_I= 19 %, θ_{cg}=14.7 % and θ_{Ig}= 5.4 % which coincide to average value from 1970 to 1990 of weighted average values over the fifteen U.E. countries based on PWT 5.6 time-series from Summers and Heston (1988). The steady-state share of output going to net interest bill of the public debt θ_b = 1.52 % is calculated along the same lines but with OECD time-series. Mendoza, Razin and Tesar (1994) have produced measures of tax rates consistent with our theoretical model for the G-7 countries. Calculations of weighted average values from 1970 to 1988 over Germany, France and United-Kingdom[9] give 35.3 % and 34.5 %, for wage income tax rate and capital income tax rates, respectively, so we will take $\bar{\tau} = 35$ % in the baseline case.
Structural parameters are more difficult to obtain, firstly because estimates for a given country are not consensual and secondly because aggregation over European countries is difficult to perform. We choose $\rho = 4$ % that is a standard value in the literature. Blanchard (1997) has estimated the value 1.04 for the technological elasticity of substitution in continental Europe. Here we take $\sigma = 1$. We have no such estimates for intertemporal elasticities of consumption demand and for labor supply at the European level. For the U.K., Attanasio and Weber (1993) estimate the value 0.33 for ϵ with macro data. With micro data they find 0.77 a value close to 0.8 which is retained in French studies following Letournel and Schubert (1991), we then also take $\epsilon = 0.8$. For η we simply choose the mean value 0.8 in the plausible range of estimates $[0.4, 2]$ discussed by Hairault (1992) for France, for sensitivity analysis we will take the bounds of this range. ϵ_g has been estimated in numerous studies but the doubts about the statistical relevance of these estimates or about the corresponding size (Munnell 1992) lead generally to choose arbitrarily ϵ_g. Following Baxter and King (1993), ϵ_g is assumed here to be equal to the share of output going to public investment (*e.g.* 0.054).
As the European output share of labor income fluctuates (Blanchard 1997) and as it depends on the way in which certain types of income are apportioned, we let this value

[8] There is no other specifics effects because of intertemporal and infratemporal separability of preferences (McLaughlin 1995).

[9] The lack of data on Italy for most of years leads us to eliminate this country.

adjust in order to imply, in the baseline case, $(\bar{k}+\bar{k}^g)/\bar{y} = 2.85$, the weighted average value over European countries obtained from capital stocks series calculated by Nehru and Dhareshwar (1993). Doing this we then obtain, in **variant 1** of public investment, the following values θ_L = 67.3 %, F_k = 14.7 %, δ = 8.56 % and $\bar{k}/\bar{y}$ = 2.22, which provide reasonable fit of historical data over the period 1970-1990[10]. The initial steady-state ratio $\bar{k}^g/\bar{y}$ is residually equal to 0.63. In **variant 2** the parameter B has to be adjusted to reproduce the same ratios. Initial lump-sum transfers are fixed to imply a balanced-budget consistent with the historical ratio of public debt ($\bar{b}/\bar{y} = 24.7\%$), while the production scale parameter and the constant instantaneous utility share of leisure are chosen to imply steady-state values of $\bar{y} = 1$ and 0.2 for the labor time share. At last, we arbitrary choose a length T of tax delay equal to 5 years in the baseline case.

3. BORROWING FINANCING OF INCOME TAX-CUTS

First, we study the impacts of a temporary and partial substitution of public debt issues, instead of using distortionary taxation, to finance a given path of public purchases (11). This policy has been extensively analysed by Trostel (1993) so we are just recalling the main insights before discussing about welfare effects and the plausibility of self-financing phenomena. Figures 1.(a.)-1.(d.) present the time paths, in tax-elasticity form, of the changes in macro-economic variables and in current production prices and intertemporal prices and in real utility flows ($U/U_c(c_0)$). Table 1 reports the corresponding values for changes in variables and in their present values, discounted at the rate ρ, during the **deficit period** (from time 0 to time T) $PV_{t<T}$ and during the **refinancing period** (for $t \geq T$) $PV_{t \geq T}$.

Table 1: Delaying the general income tax collection : sensitivity to η

(Percentage change per initial percentage decrease in the income tax rate)

time	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{y}$	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{y}$
	$\eta = 0.2$, $\Delta_W = -0.0024$, $\xi = 0.226$					$\eta = 0.4$, $\Delta_W = 0.0011$, $\xi = 0.219$				
0	0	-0.02	0.11	0.43	0.07	0	0.01	0.19	0.64	0.13
$T-i$	0.13	0.08	0.09	0.30	0.10	0.22	0.11	0.17	0.62	0.18
T	0.13	0.08	-0.03	-0.14	0.02	0.22	0.11	-0.06	-0.20	0.03
∞	-0.09	-0.04	-0.02	-0.09	-0.04	-0.10	-0.06	-0.03	-0.10	-0.05
$PV_{<T}$	0.32	0.14	0.45	1.68	0.40	0.52	0.28	0.80	2.84	0.71
$PV_{\geq T}$	-0.67	-0.19	-0.46	-2.19	-0.53	-0.38	-0.25	-0.79	-2.63	-0.65
	$\eta = 0.8$, $\Delta_W = 0.008$, $\xi = 0.208$					$\eta = 2$, $\Delta_W = 0.0227$, $\xi = 0.183$				
0	0	0.04	0.31	0.96	0.21	0	0.10	0.50	1.45	0.34
$T-i$	0.36	0.16	0.29	1.14	0.31	0.59	0.24	0.53	2.12	0.55
T	0.36	0.16	-0.12	-0.32	0.03	0.59	0.24	-0.24	-0.61	0.03
∞	-0.11	-0.07	-0.04	-0.11	-0.06	-0.11	-0.08	-0.05	-0.11	-0.07
$PV_{<T}$	0.81	0.48	1.34	4.58	1.16	1.29	0.81	2.24	7.55	1.93
$PV_{\geq T}$	0.07	-0.28	-1.22	-3.29	-0.79	0.84	-0.19	-1.83	-4.42	-0.96

[10]For instance, the European weighted average of labor share is equal to 66.7 % over the period with OECD corporate sector data.

Figure 1: Delaying income tax collection, baseline case : $\eta = 0.8$

(Percentage change per initial percentage decrease in the income tax rate)

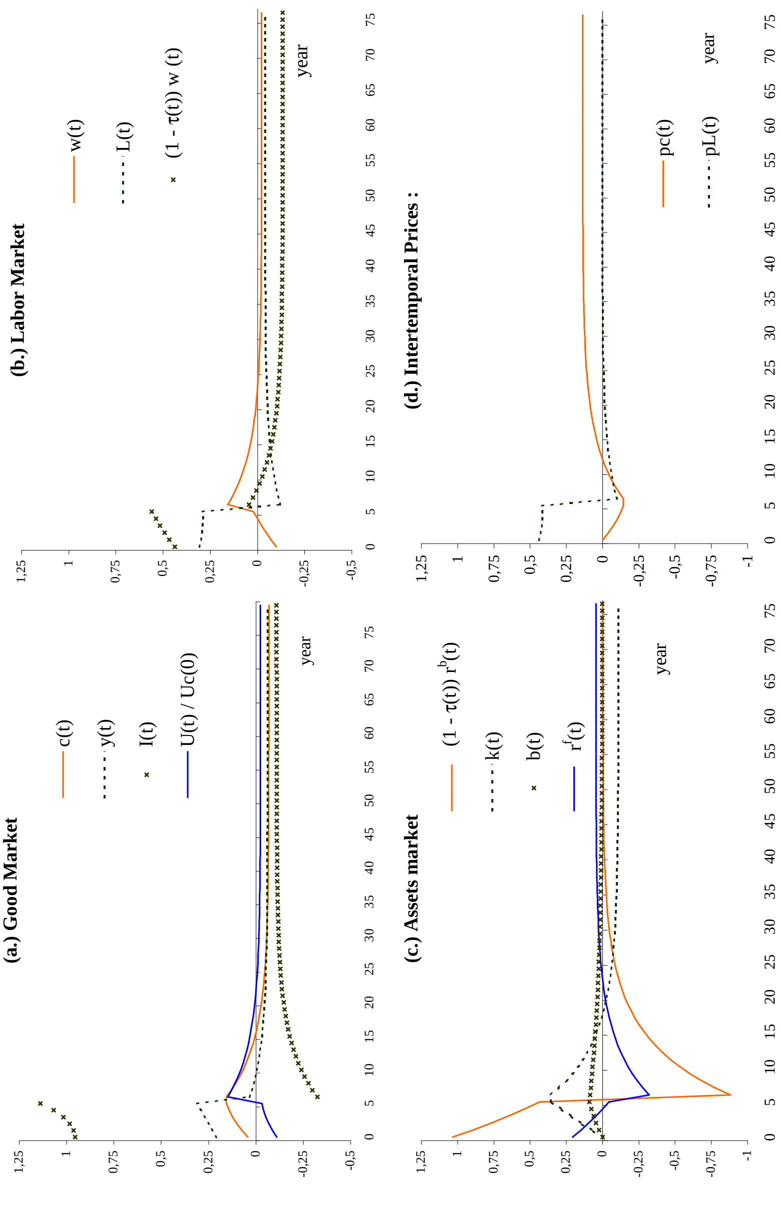

Table 2: Intertemporal Effects on Consumption and Labor

(Percentage change per initial percentage decrease in the income tax rate)

	Baseline		$\eta = 0.2$		$\tau = 0.2$	
	$\hat{c}$	$\hat{L}$	$\hat{c}$	$\hat{L}$	$\hat{c}$	$\hat{L}$
intert. subst. effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	0.02	-0.02	-0.013	0.003	0.004	-0.002
intert. subst. effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	0.02	-0.02	-0.003	0.001	0.002	-0.001
intert. wealth effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	-0.022	0.22	0.014	-0.004	-0.005	0.002
intert. wealth effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	0.025	-0.024	-0.016	0.004	0.005	-0.003

As remarked by Trostel (p.212-214) the short run consequences of income tax cuts are dominated by effects of delaying a wage income tax. The policy implies short and medium run "Keynesian like" effects on consumption and output ensuing from the intertemporal substitution towards labour during the deficit period, even with a low elasticity of labor supply. Under all the parameterizations presented in the Table, this stimulus of the tax bases remains insufficient to avoid repayment of the outstanding debt without a future increase in tax rates. Then in the long run the policy will depress consumption, investment and output. Contrary to what was asserted by Trostel, long run consequences are not mostly determined by the effects of increasing a tax on interest income. If it was true the long run consumption would be greater and the investment would be lower than in Table 1, because the negative interest income tax-cut effect in the short run on intertemporal prices would dominate the positive effects of the subsequent tax increase.

Most of rise in consumption before T follows from the direct contemporaneous substitution effects of increasing p_t^c (Figs. 1.(d.)). But as indicated in Table 2 intertemporal effects also matter. When labor supply is rather elastic, $\{p_t^c\}_{t\in\mathbb{R}^+}$ is shifted up, consumption being then more expensive, the corresponding wealth effects are negative and always dominate the associated intertemporal substitution effects. But, on the other side, $\{p_t^L\}_{t\in\mathbb{R}^+}$ is also shifted up, so that the overall impact on consumption is positive from both wealth effects associated to greater wage income and intertemporal substitution effects associated to more expensive leisure. If labor supply is less elastic ($\eta = 0.2$ in Table 2), as contemporaneous substitution effects are similar, the time paths of changes in consumption and labor keep roughly same profile, but intertemporal effects are now reversed. In this case, as the policy mainly acts trough the interest income tax channel, it unambiguously reinforces tax distorsions between current and future consumption prices and reveals as being welfare-deserving. On the contrary when labor supply is more elastic the policy has two kind of effects: it reduces the taxation burden associated to the static trade-off between consumption and leisure in the short run whereas it increases this trade-off for $t \geq T$. For most of our parameterizations the first effect dominates and the policy is welfare-improving. In other words the policy sufficiently stimulates tax bases in order to imply an overall reduction of the tax rates and then a global positive wealth effect on consumption. Moreover tax base effects decrease with the size of initial tax rates so positive wealth effects are lower too (see last column of Table 2). In the limiting case of no initial taxation the policy would then obviously have no welfare effects while intertemporal substitution effects would remain.

Deficit financed tax-cuts may be welfare-improving when there is strong base effects because labor supply is very elastic and/or initial taxes are important. But can this effect be sufficiently stronger to imply some kind of *dynamic Laffer effects*? In Table 3 we report the limiting value $\bar{\tau}^W$ such that for initial tax rate $\bar{\tau} \geq \bar{\tau}^W$ the deficit policy will be self-financed. We can notice that except for very elastic labour supply such a phenomenon is ruled out. Nevertheless dynamic Laffer effects cannot be theoretically rejected for initial wage income tax rates fixed at prohibitive levels (greater than 60 %).

Table 3: Limiting initial tax rate ($\bar{\tau}^W$) for dynamic Laffer effect appearance

base : 0.64	$\eta = 0.2$: 0.79	$\eta = 0.4$: 0.71	$\eta = 2$: 0.56	$\epsilon = 0.4$: 0.7
$\epsilon = 1.2$: 0.61	$\sigma = 0.5$: 0.66	$\sigma = 1.2$: 0.63	$T = 10$: 0.66	$B_0 = 0$:0.645

4. BORROWING FINANCING OF GOVERNMENT INVESTMENT SPENDING

We now focus on the expenditure side of the public policy. The government announces a partial and temporary rise in public investment, financed with borrowing, together with a future adjustment in the income tax rate. Before analysing this case, we present two illustrative experiments on useless investment spending (*e.g.* $\epsilon_g = 0$) in order to focus on the crowding out effect of government purchases rise on private demand.

4.1. Unproductive public investment deficits

Debt repayment with government expenditures : pure wealth effect

Assuming that, contrary to policies (11), public spending are initially raised and later adjusted (left-hand side of Table 4), while keeping tax rates constant, means that deficit finance is equivalent to lump-sum taxation changes. Economic effects are then only those associated to an intertemporally balanced budget change path of government purchases.

Table 4: Borrowing financed “useless" ($\epsilon_g = 0$) government investment

(Percentage change per initial percentage increase in I^g)

	Debt repaid by decrease in I^g					Debt repaid by increase in τ				
	$\xi = 0.2779$			$\Delta_W = 0.0066$		$\xi = 0.3412$			$\Delta_W = -0.2227$	
time	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$
0	0	-0.03	0.02	-0.1	0.02	0	-0.04	0.03	-0.06	0.02
$T-i$	-0.07	-0.02	0.00	-0.35	-0.02	-0.05	-0.03	0.01	-0.24	-0.01
T	-0.07	-0.02	0.00	0.02	-0.02	-0.05	-0.03	-0.01	-0.02	-0.02
∞	-0.01	0.01	-0.01	-0.01	-0.01	-0.03	-0.02	-0.01	-0.03	-0.02
$PV_{<T}$	-0.13	-0.12	0.07	-0.89	0.00	-0.08	-0.15	0.10	-0.58	0.04
$PV_{\geq T}$	-0.52	0.07	-0.16	-0.07	-0.28	-0.67	-0.40	-0.19	-0.52	-0.34

During the deficit period, the reform has an “anti-Keynesian" effect on private consumption. Nevertheless, if the decrease of private capital stock is limited, a “pro-Keynesian" effect on output may arise from the increase in labor supply as a response to the fall of household current earnings (*e.g.* Baxter and King (1993)). Whatever the labor and the production shifts, the consumption will be lower at $t = 0$, as well as during the whole deficit period, than its initial value. Despite the fall of consumption and the rise of output, the extra private saving is lower than government des-saving. In other words, as the household smooths his consumption profile, the resources withdrawal effect also affects private investment. Moreover, despite an unambiguous positive wealth effect (see hereafter), the initial fall of consumption means that policy is characterized by important intertemporal substitution effects towards future consumption and leisure. Indeed, the crowding out of private investment by government purchases before T will cause a gradual fall of intertemporal prices. So as time move forwards the consumption is gradually rising and the resources withdrawal effect from government purchases is reported on private investment.
In the refinancing period, despite a negative “multiplier" effect associated to falling down of the labor, the lower amount of government purchases stimulates the private demand and consumption will steadily growing until it reaches a new, higher steady-state level (see Baxter and King (1993) for details). The policy implies welfare benefits: for non-zero initial tax rates the overall decrease of the tax base implies such a permanent decrease in useless government expenditures after T that the overall change in the present value of the public expenditure is negative.

Unproductive government investment deficit repaid by taxation

When the government meets its intertemporal constraint by adjusting the income tax rate, the deficit is no longer neutral (right-hand side of Table 4). But whatever be the method of debt repayment the short-run features are the same. As the effects are roughly the opposite of those of the symmetrical policy (tax-cut then spending) studied in Judd (1985) indicates that elastic labor supply behaviour does not really matter. As the temporary increase in “useless" public spending is now ultimately financed by permanent increase in distortionary tax rates the policy is welfare-deserving. Despite this kind of trivial conclusion it can be retained that deficit-financed public spending rise are featured by stronger wealth effects and smoother consumption paths than tax-cuts policies, mainly because they have only indirect effects on intertemporal prices in the short-run. Moreover we can notice that financing a temporary increase of expenditures by the way of borrowing rather than with time-to-time balanced budget adjustments in tax rates as in Baxter and King (1993) implies intertemporal substitution towards work in the short-run and then increase in output.

4.2. Productive government expenditure deficits

In the deficit period, the policy has now two opposite direct effects on private demand : first, the negative private resources-withdrawal effect associated to the rise of I^g and second, the positive tax-base effect ensuing from the output rise with the extra public

capital stock accumulation.
For a given private capital to labor ratio, the sign of the global direct effect depends firstly on the wedge between the output share of public investment and the elasticity of output to k^g, and secondly on the speed of built in k^g (law of motion variants). The rise of the public capital also implies indirect price effects : since it increases the rate of return of the private capital it lowers gradually the intertemporal price of consumption, at least in the short and medium-run (Figs 2 and 3 (d.)). The wage rate is rising too with the public stock, so that the effect on the intertemporal price of leisure remains ambiguous. When the public investment increase directly impacts the output like in **variant 2** the intertemporal price of leisure increases during the deficit period whereas it diminishes when the rise in public capital stock is sluggish but more lasting like in **variant 1**. In the future, the rise in tax rates will imply a gradually increase in the intertemporal price of consumption demand but here again the effect on intertemporal price of leisure is ambiguous.

Table 5: Borrowing financed productive public investment ($\epsilon_g = 0.054$)

(Percentage change per initial percentage increase in I^g)

	variant 1. $\xi = 0.2036$			$\Delta_W = -0.0777$		**variant 2.** $\xi = 0.176$			$\Delta_W = 0.0019$	
time	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$
0	0	-0,03	0,02	-0,12	0,01	0	0,00	0,04	0,14	0,08
$T-i$	-0,05	-0,01	0,01	-0,18	0,01	0,04	0,02	0,03	0,11	0,09
T	-0,05	-0,01	0,00	0,06	0,00	0,04	0,02	-0,02	-0,04	0,00
∞	-0,02	-0,01	-0,01	-0,02	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
$PV_{<T}$	-0,10	-0,1	0,09	-0,61	0,07	0,11	0,04	0,15	0,58	0,38
$PV_{\geq T}$	-0,28	-0,10	-0,12	0,05	-0,05	0,00	-0,04	-0,16	-0,42	-0,11

At a first glance, the effects of this policy on current prices, during the deficit period, are similar to those ensuing from an income tax-cut (Figs 2 and 3 (b.)-(c.)). In the baseline case, there is no direct crowding effect of private demand in **variant 2**; both deficit policies then present the same features, except that here private investment is gradually decreasing after its initial jump. The features look like those of a general income tax-cut where labor supply is not very elastic. As increasing k^g raises the gross-of-tax interest rate and not the net-of-tax one, the policy affects less the capital to labor ratio than an income tax-cut and substitution towards consumption during the deficit period is then less pronounced.
In the baseline case, the results of the policy in **variant 1.** (left-hand side of Table 5) are similar to those of the reform in the "useless" public expenditures case during the deficit period. This is consistent since it takes time to build the extra public capital stock whereas resource costs are immediate. So, in the short-run, the negative crowding out effect of public purchases on private demand is overwhelming. But if positive direct and price effects take more time to be effective they are also more persistent than in **variant 2.** Then contrarily to what happened in the "useless" expenditures case, the policy may draws some benefits in the medium-run under some plausible parameterizations (see sensitivity analysis in Table 8 of the appendix).
In both variants the labor supply is jumping up at $t = 0$ according to the intertemporal

Figure 2: Borrowing financed public investment : **variant 1.**, baseline case $\epsilon_g = \theta_{Ig}$ (Percentage change per initial percentage increase in I^g)

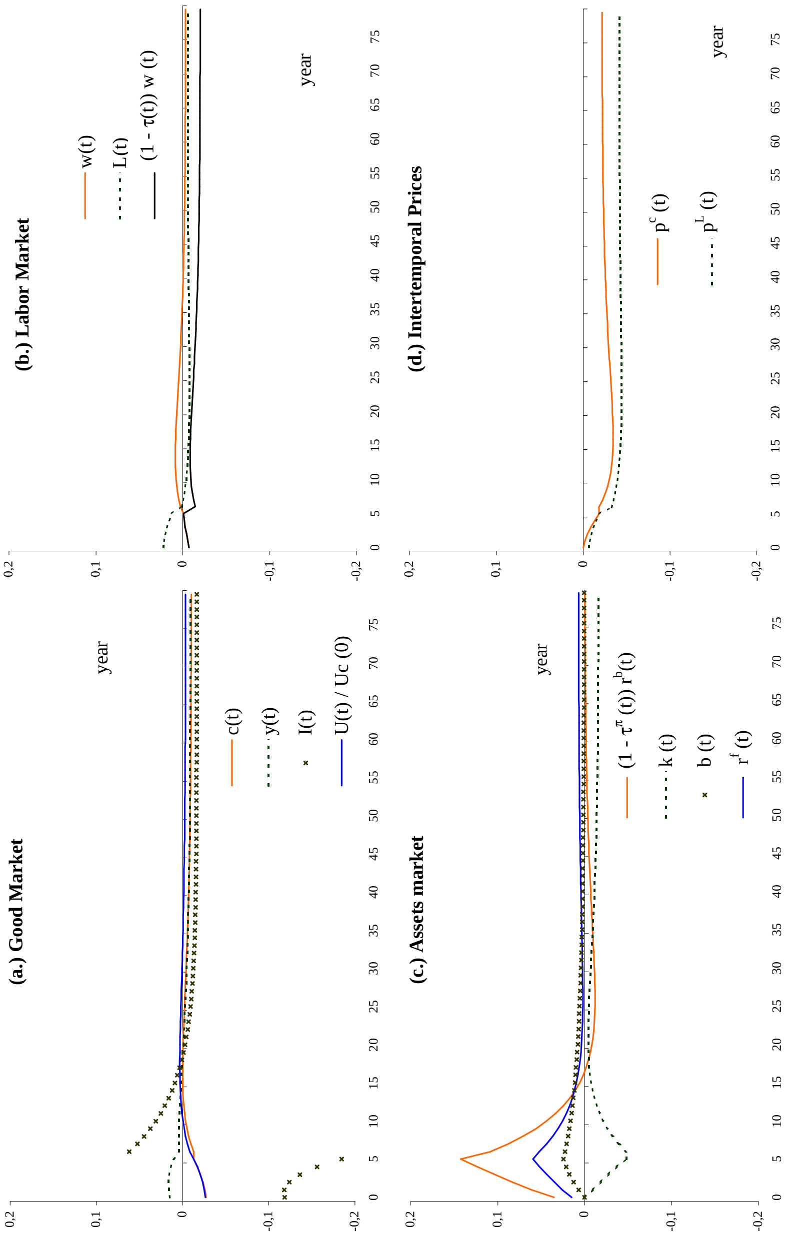

Figure 3: Borrowing financed public investment : **variant 2.**, baseline case $\epsilon_g = \theta_{Ig}$ (Percentage change per initial percentage increase in I^g)

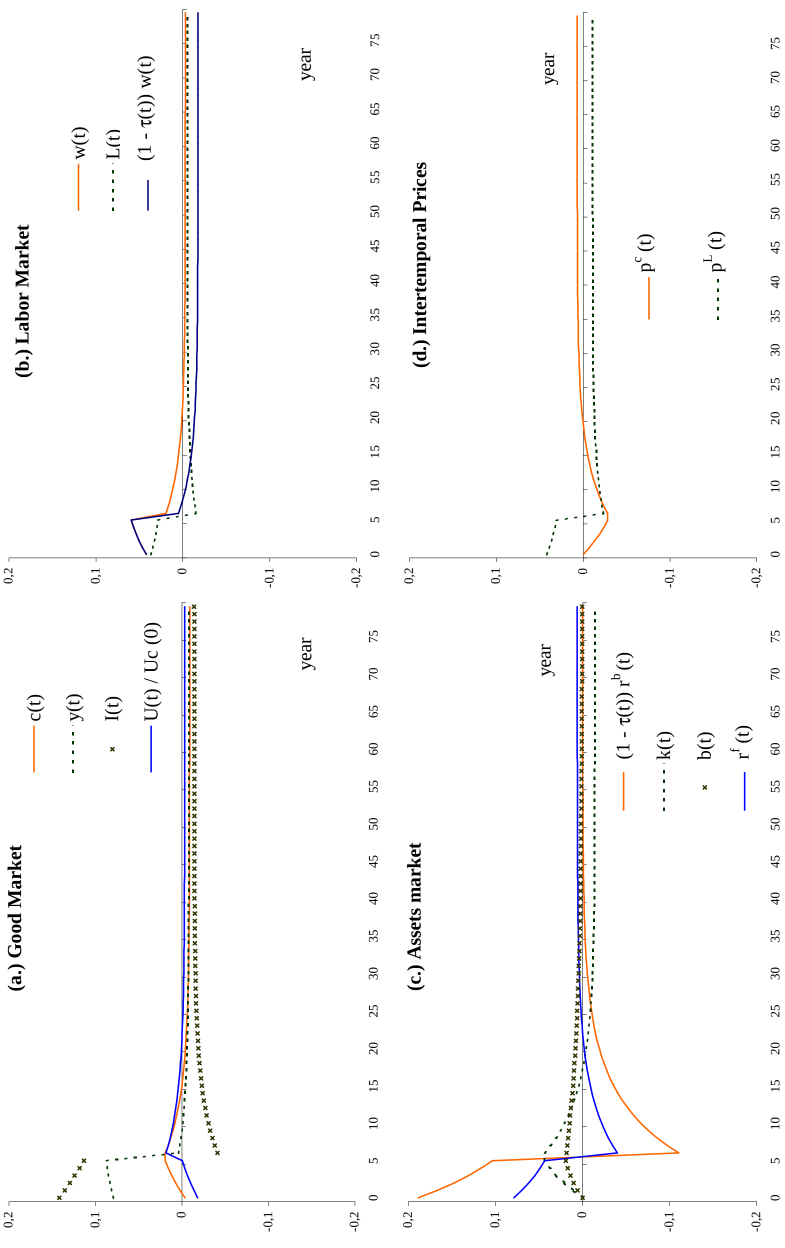

Table 6: Intertemporal Effects on Consumption and Labor

(Percentage change per initial percentage decrease in the income tax rate)

	Baseline $\hat{c}$	Baseline $\hat{L}$	$\epsilon^g = 0.1$ $\hat{c}$	$\epsilon^g = 0.1$ $\hat{L}$	$\theta^{Ig} = 0.1$ $\hat{c}$	$\theta^{Ig} = 0.1$ $\hat{L}$
variant 1.						
intert. subst. effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	-0.011	0.011	-0.013	0.013	-0.02	0.02
intert. subst. effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	-0.012	0.012	-0.008	0.008	-0.03	0.028
intert. wealth effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	0.013	-0.013	0.015	-0.015	0.024	-0.024
intert. wealth effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	-0.015	0.015	-0.01	0.01	-0.036	0.036
variant 2.						
intert. subst. effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	-0.002	0.002	-0.003	0.003	-0.011	0.011
intert. subst. effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	-0.002	0.002	-0.003	0.003	-0.017	0.017
intert. wealth effects of $\{\hat{p}_t^c\}_{t\in\mathbb{R}+}$	0.002	-0.002	0.004	-0.004	0.012	-0.012
intert. wealth effects of $\{\hat{p}_t^L\}_{t\in\mathbb{R}+}$	-0.002	0.002	-0.003	0.003	-0.021	0.021

substitution effect, afterwards it is gradually decreasing. For private investment, despite an intertemporal substitution causes initial increase, the resources constraint effect may be preeminent. If the public capital stock takes time to be built (**variant 1.**) investment will be crowded out the during deficit period. If on the contrary public investment increase steadily the output (**variant 2.**) the investment will increase. In both variants and for the baseline case, the changes in intertemporal prices are negative in present values whereas they were positive for an income tax-cut. So general substitution effects are negative and the overall substitution effects (contemporaneous plus intertemporal) on consumption during the deficit period are ambiguous (see Table 6). The wealth effect is also ambiguous: over the horizon the purchases are globally cheaper but the wage incomes are also lower. The fall of intertemporal wage is important in **variant 1** so negative wealth effect dominates in the baseline case, in **variant 2** we have the opposite.

In **variant 2**, for a more productive public capital stock than in the baseline case there is an extra positive resource effect during the deficit; the policy has now exactly the same features as income tax-cuts (see $\epsilon_g = 0.1$ case in Table 8). The general substitution effects are now positive (Table 6) because this extra output increase before T implies a stronger tax base effect and the subsequent tax increase will be very weak. So crowding in of investment follows only here from temporary increase in output. In the **variant 1.**, for $\epsilon_g = 0.1$ the extra effect remains insufficient to reverse general features of the policy except that the policy is now welfare-improving.

Productivity of public capital, welfare effects and self-financing

As the benefits associated with the policy are occurring in the medium-run, deficit financed public investment policies may be welfare-improving under parameterizations that imply a slow speed of convergence for the economy (low ϵ or high σ). It's worth noticing from the sensitivity analysis that self-financing phenomena may not be ruled out. At first glance, the size of ϵ_g appears to be the key element in the success of the policy. For a high elasticity of output to the public capital, the rise of the flow of public services implied by the reform can sufficiently increase the tax base to meet

Table 7: Limiting values of public capital elasticity for deficit policy induces : "Welfare gains" (ϵ_g^W) and "*Self-financing*" (ϵ_g^ξ)

	variant 1.		**variant 2.**			**variant 1.**		**variant 2.**	
	ϵ_g^W	ϵ_g^ξ	ϵ_g^W	ϵ_g^ξ		ϵ_g^W	ϵ_g^ξ	ϵ_g^W	ϵ_g^ξ
baseline	0.082	0.133	0.053	0.111	$\epsilon = 0.4$	0.087	0.22	0.052	0.13
$\eta = 0.4$	0.076	0.074	0.054	0.116	$\epsilon = 1.2$	0.081	0.117	0.054	0.103
$\eta = 2$	0.091	0.285	0.051	0.102	$\sigma = 0.5$	0.086	0.167	0.054	0.113
$\tau = 0.2$	0.089	0.261	0.055	0.199	$\theta_{Ig} = 0.1$	0.147	0.281	0.098	0.211
$T = 10$	0.082	0.16	0.053	0.118	$\theta_{Ig} = 0.025$	0.039	0.053	0.024	0.05

intertemporal budget balance without further increase of the income tax rate after time T.

Table 7 reports, under different parameterizations, the limiting value ϵ_g^W such that for greater elasticities the policy would imply welfare benefits and the limiting value ϵ_g^ξ for the policy to be self-financed. *It appears that policy may be self-financed in both variants*. Moreover even though the required value for ϵ^g to meet this instance appears to be greater in **variant 1.** than in **variant 2**, the critical values of ϵ_g remain reasonable regarding to conventional estimates. As a matter of fact, the Table indicates that *what really matters is the wedge between ϵ_g and the initial share of public investment in national product*. When the economy initially presents a "low" public capital stock[11] with respect to its productivity, for instance for $\epsilon_g = 0.14$ a marginal increase in public investment would be self-financed in both variants in the baseline case. But if θ_{Ig} is initially equal to 10 %, then the policy will be only self-financed for values of ϵ_g greater than 0.29, in the **variant 1.**, and 0.21 in the **variant 2.** Then, in accordance to standard productive efficiency principles, the weaker the amount of public capital is, relative to its productivity, the likelier the deficit policy will reveals as being self-financed.

5. CONCLUSION

This paper pointed out that, contrary to some supply side intuitions, self-financing effects associated to tax-cut policies are not relevant for a large range of plausible parameters. Temporary and partially substitution of debt for income tax will never encourage sufficiently the activity to avoid unsustainable increase of public debt, except for prohibitive initial rates. Nevertheless this kind of deficit appears to be welfare-improving in most of our numerical examples.

Oppositely, we find that some self-financing phenomena could occur in the case of deficits caused by public investment, at least when the output elasticity to public capital is greater than the output share going to public investment expenditures. Even when this condition is not met, the policy may still increase welfare. At last, self-financing

[11] By a "low" public capital stock we mean that the initial situation is not consistent with aggregate productive efficiency rule which implies in a command optimum with lump-sum taxes the steady-state configurations : $\epsilon_g = \theta_{Ig} \cdot \theta_k / \theta_I$ in the variant 1. and $\epsilon^g = \theta_{Ig}$ in the variant 2. (see Arrow and Kurz (1970) for more details).

phenomena and welfare effects associated to each kind of deficit policies appear to be very sensitive to the underlying parameter values choices and model assumptions.

Some shortcomings of this study may be pointed out. A natural way to explore is the interaction between deficit and the engines of growth. Ireland (1994) showed in a simple endogenous growth model that tax-base effects associated with a tax-cut policy promoting growth are strong enough to imply Laffer effects. But as he considers "useless" government expenditures this policy implies that the share of national product going to public spending is zero in the long-run. In a dynamic version of Barro (1990)'s endogenous growth model, Chateau (2000) takes into account the productive nature of government investment, it appears that self-financing phenomena cannot appear. It will then be interesting to link this with our assumption of elastic labor. In a similar spirit, Trostel (1995) extended the RA-model to take into account human capital accumulation. He showed that short-run effects of delaying income taxation is magnified with human capital. So taking into account human capital as an engine of endogenous growth would perhaps reveals more easily dynamic Laffer effect.

A APPENDIX

The productive spending deficit describes in (11) is separated a two steps so is the solution of the system (12) :

$$\begin{pmatrix} \hat{\mu}(t) \\ \hat{k}(t) \end{pmatrix} = \begin{cases} P \cdot D \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} - J^{-1} \cdot \Psi \begin{pmatrix} 0 \\ u^{Ig} \end{pmatrix} - P \cdot G \cdot P^{-1} [\frac{u^{Ig}}{\bar{k}^g} J^{-1} + \hat{k}^g(t)] \cdot \Gamma & 0 \leq t < T, \\ P \cdot D \begin{pmatrix} y_1 \\ y_2 \end{pmatrix} - J^{-1} \cdot \Psi \begin{pmatrix} \xi \\ 0 \end{pmatrix} - P \cdot G \cdot P^{-1} \cdot \Gamma \hat{k}^g(t) & t \geq T, \end{cases}$$

where P is the matrix of the eigenvectors of J, D is a diagonal matrix with components $D_{(i,i)} = e^{\lambda_i t}$, $\forall i = 1, 2$, with $\lambda_2 < 0 < \lambda_1$ the eigenvalue of J and G is a diagonal matrix with $G_{(i,i)} = (\lambda_i + \delta_g)^{-1}$, $\forall i = 1, 2$. The general solution will be fully determined if one knows the four constants x_1, x_2, y_1, and y_2. These unknowns are determined by initial and terminal conditions and by the continuity behaviour of the system at time T. The solution of the system in **variant 2.** can be obtain directly by imposing $\delta_g = 0$ and taking into account that $\hat{k}^g(t)$ is equal to $u^{Ig}/\bar{I}^g$ for $t < T$, and equal to 0 for $t \geq T$.

The present value of the changes, respectively before ($PV_{<T}$) and after ($PV_{\geq T}$) date T, of the *state* trajectories, discounted at ρ, are:

$$\begin{aligned} (\rho I - J) \cdot \begin{pmatrix} PV_{<T}(\hat{\mu}) \\ PV_{<T}(\hat{k}) \end{pmatrix} &= \frac{e^{-\rho T} - 1}{\rho} \Psi \cdot \begin{pmatrix} 0 \\ u^{Ig} \end{pmatrix} + \begin{pmatrix} \hat{\mu}_0 \\ 0 \end{pmatrix} - e^{-\rho T} \begin{pmatrix} \hat{\mu}_T \\ \hat{k}_T \end{pmatrix} + \Gamma PV_{<T}(\hat{k}^g), \\ (\rho I - J) \cdot \begin{pmatrix} PV_{\geq T}(\hat{\mu}) \\ PV_{\geq T}(\hat{k}) \end{pmatrix} &= \frac{\xi e^{-\rho T}}{\rho} \Psi \cdot \begin{pmatrix} \xi \\ 0 \end{pmatrix} + e^{-\rho T} \begin{pmatrix} \hat{\mu}_T \\ \hat{k}_T \end{pmatrix} + \Gamma PV_{\geq T}(\hat{k}^g), \end{aligned}$$

where $\hat{\mu}_0$, the initial jump of shadow price, is given by :

$$\begin{aligned}\hat{\mu}_0 &= \frac{\theta_k\left(J_{(1,1)}-\lambda_1\right)}{\alpha J_{(2,1)}}\left[\Psi_{(2,2)}u^w H^w(\lambda_1)+\Psi_{(2,3)}u^{Ig}H^{Ig}(\lambda_1)+\Gamma_{(1,1)}\hat{K}^g(\lambda_1)\right] \\ &- \frac{1}{\alpha}\left[\Psi_{(1,1)}u^\pi H^\pi(\lambda_1)+\Psi_{(1,2)}u^w H^w(\lambda_1)+\Gamma_{(2,1)}\hat{K}^g(\lambda_1)\right],\end{aligned}$$

with $H^\tau(\lambda_1)$ and $\hat{K}^g(\lambda_1)$ the present value of the reforms $\{h^\tau(t)\}_{t\in\mathbb{R}^+}$ and of the changes $\{\hat{k}^g(t)\}_{t\in\mathbb{R}^+}$, discounted at the positive eigenvalue λ_1.
At last, to find the size of the subsequent adjustment ξ of the tax rate, we have to check that the whole policy meet the intertemporal budget constraint of the government (9), linearizing it give us (capital letter $X(\rho)$ expresses the present value of $\{x_u(t)\}_{t\in\mathbb{R}^+}$, discounted at ρ) :

$$[\hat{\mu}_0-\rho\hat{M}(\rho)]b_0=\bar{\tau}[F_L L(\rho)+(F_k-\delta)K(\rho)]-u^{Ig}H^{Ig}(\rho)+u^\tau[\bar{y}-\delta\bar{k}]H^\tau(\rho)+\epsilon_g\bar{\tau}\bar{y}\hat{K}^g(\rho)$$

Table 8: Sensitivity Analysis of Table 5

(Percentage change per initial percentage increase in I^g)

	variant 1.					**variant 2.**				
time	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$	$\hat{k}$	$\hat{c}$	$\hat{L}$	$\hat{I}$	$\hat{Y}$
$\epsilon_g = 0.1$	$\xi = 0.0864$			$\Delta_W = 0.0458$		$\xi = 0.0352$			$\Delta_W = 0.1931$	
0	0	-0.02	0.01	-0.17	0.01	0	0.03	0.04	0.31	0.13
$T-i$	-0.05	0.00	0.01	-0.14	0.03	0.12	0.06	0.04	0.41	0.17
T	-0.05	0.00	0.01	0.13	0.02	0.12	0.06	-0.02	-0.06	0.02
∞	-0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
$PV_{<T}$	-0.12	-0.05	0.07	-0.64	0.09	0.27	0.20	0.18	1.57	0.67
$PV_{\geq T}$	0.05	0.16	-0.07	0.53	0.20	0.56	0.26	-0.13	-0.35	0.10
$\eta = 2$	$\xi = 0.2765$			$\Delta_W = -0.0906$		$\xi = 0.1617$			$\Delta_W = 0.0102$	
0	0	-0.02	0.04	-0.08	0.02	0	0.00	0.06	0.21	0.10
$T-i$	-0.03	-0.01	0.02	-0.14	0.02	0.07	0.03	0.05	0.21	0.11
T	-0.03	-0.01	-0.01	0.05	0.00	0.07	0.03	-0.03	-0.08	0.00
∞	-0.03	-0.02	-0.01	-0.03	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01
$PV_{<T}$	-0.07	-0.08	0.15	-0.40	0.12	0.17	0.08	0.25	0.92	0.47
$PV_{\geq T}$	-0.34	-0.20	-0.25	-0.19	-0.16	0.07	-0.05	-0.24	-0.57	-0.14
$\tau = 0.2$	$\xi = 0.2402$			$\Delta_W = -0.066$		$\xi = 0.2107$			$\Delta_W = 0.0005$	
0	0	-0.03	0.02	-0.11	0.02	0	-0.01	0.04	0.16	0.08
$T-i$	-0.04	-0.01	0.01	-0.17	0.01	0.05	0.02	0.03	0.11	0.09
T	-0.04	-0.01	0.00	0.07	0.01	0.05	0.02	-0.02	-0.06	0.00
∞	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
$PV_{<T}$	-0.09	-0.10	0.09	-0.56	0.08	0.12	0.04	0.15	0.60	0.38
$PV_{\geq T}$	-0.22	-0.07	-0.12	0.09	-0.03	-0.01	-0.05	-0.16	-0.46	-0.12
$T = 10$	$\xi = 0.4707$			$\Delta_W = -0.1316$		$\xi = 0.3857$			$\Delta_W = 0.006$	
0	0	-0.04	0.03	-0.06	0.02	0	0.00	0.04	0.15	0.08
$T-i$	-0.04	0.00	0.01	-0.13	0.03	0.07	0.03	0.03	0.11	0.09
T	-0.04	0.00	-0.01	0.07	0.01	0.07	0.03	-0.03	-0.08	0.00
∞	-0.04	-0.02	-0.01	-0.04	-0.02	-0.03	-0.02	-0.01	-0.03	-0.02
$PV_{<T}$	-0.13	-0.19	0.21	-0.47	0.24	0.34	0.13	0.25	1.06	0.72
$PV_{\geq T}$	-0.34	-0.14	-0.27	-0.22	-0.13	-0.11	-0.12	-0.26	-0.72	-0.21
$\sigma = 0.5$	$\xi = 0.231$			$\Delta_W = -0.0833$		$\xi = 0.1788$			$\Delta_W = 0.0$	
0	0	-0.04	0.02	-0.08	0.02	0	0.00	0.03	0.12	0.07
$T-i$	-0.04	-0.01	0.01	-0.19	0.01	0.03	0.02	0.03	0.08	0.08
T	-0.04	-0.01	0.00	0.06	0.00	0.03	0.02	-0.01	-0.05	0.00
∞	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
$PV_{<T}$	-0.08	-0.13	0.08	-0.51	0.07	0.08	0.05	0.13	0.44	0.36
$PV_{\geq T}$	-0.26	-0.11	-0.16	0.01	-0.07	-0.04	-0.05	-0.14	-0.37	-0.10
$\epsilon = 0.4$	$\xi = 0.2554$			$\Delta_W = -0.0738$		$\xi = 0.1703$			$\Delta_W = 0.005$	
0	0	-0.02	0.03	-0.13	0.02	0	0.00	0.03	0.12	0.08
$T-i$	-0.05	-0.01	0.02	-0.19	0.01	0.04	0.01	0.03	0.13	0.09
T	-0.05	-0.01	0.00	0.05	0.00	0.04	0.01	-0.02	-0.03	0.00
∞	-0.02	-0.01	0.00	-0.02	-0.01	-0.01	-0.01	0.00	-0.01	-0.01
$PV_{<T}$	-0.11	-0.06	0.11	-0.66	0.08	0.10	0.03	0.13	0.56	0.37
$PV_{\geq T}$	-0.33	-0.10	-0.11	0.01	-0.06	0.07	-0.02	-0.14	-0.31	-0.07

References

Arrow, K. and M. Kurz, *Public Investment, The Rate of Return, And Optimal Fiscal Policy*, London: The Johns Hopkins Press, 1970.

Aschauer, D.A., The Equilibrium Approach to Fiscal Policy, *Journal of Money, Credit and Banking*, Fevrier 1988, *20* (1), 1–62.

——, Is Public Expenditure Productive?, *Journal of Monetary Economics*, 1989, *25*, 177–200.

Attanasio, O. and G. Weber, Consumption growth, the inrest rate and aggregation, *Review of Economic Studies*, 1993, *60*, 631–649.

Barro, R., Are governement bonds net wealth?, *Journal of Political Economy*, 1974, *82* (6), 1095–1117.

——, The Neoclassical Approch to Fiscal Policy, in Harvard University Press, editor, *Modern Business Cycle Theory*, Cambridge: Barro,R, 1989, chapter 5.

——, Government Spending in a Simple Model of Endogenous Growth, *Journal of Political Economy*, 1990, *98*, S103–S125.

Baxter, M. and R. King, Fiscal Policy in general equilibrium, *American Economic Review*, Juin 1993, *83* (3), 315–334.

Blanchard, O.J., The medium run, *Brookings Papers on Economic Activity*, 1997, *2*, 89–158.

Blinder, A. and R. Solow, Does fiscal policy matter?, *Journal of Public Economics*, november 1973, *2*, 319–337.

Chateau, J., Which structural policy with government deficits?, *Annales d'Economie et de Statistiques*, Juillet-Octobre 2000, *59*, 107–136.

Hairault, J.O., Présentation et évaluation du courant des cycles réels, *Economie et Prévision*, 1992, *106* (5), 1–22.

Ireland, P., Supply–side economics and endogenous growth, *Journal of Monetary Economics*, 1994, *33*, 559–571.

Judd, K., Short-Run Analysis of Fiscal Policy in a Simple Foresight Model, *Journal of Political Economy*, 1985, *93*, 298–319.

——, Debt and distortionary taxation in a simple perfect foresight model, *Journal of Monetary Economics*, 1987, *20*, 51–72.

King, R., Value and Capital in the equilibrium business cycle programme, in L. Mc Kenzie and S. Zamagni, editors, *Value and Capital : fifty years later*, London: Mac Millan, 1991, chapter 10, pp. 279–309.

Letournel, P. and K. Schubert, Un modèle d'équilibre général appliqué à l'étude de la fiscalité française: résultats de long-terme, *Economie et Prévision*, 1991, *98* (91-2), 83–99.

Ludvingson, S., The macroeconomic effects of government debt in a stochastic growth model, *Journal of Monetary Economics*, 1996, *38*, 25–45.

McLaughlin, K., Intertemporal substitution and λ-constant comparative statics, *Journal of Monetary Economics*, 1995, *35*, 193–213.

Mendoza, E, A Razin, and L. Tesar, Effective tax rates in macroeconomics Cross-country estimates of tax rates on factor incomes and consumption, *Journal of Monetary Economics*, 1994, *34* (3), 297–323.

Munnell, A., Infrastructure investment and economic growth, *Journal of Economic Perspectives*, 1992, *6* (4), 189–198.

Nehru, V. and A. Dhareshwar, A New Database on Physical Capital Stock: Sources, Methodology and Results., *Rivista de Analisis Economico*, 1993, *8* (1), 37–59.

Summers, R. and A. Heston, A New Set of The International Comparaisons of Real Product and Prices : Estimates for 130 Countries, *Review of Income and Wealth*, 1988, *34*, 1–26.

Trostel, P., The nonequivalence between deficits and distortionary taxation, *Journal of Monetary Economics*, 1993, *31*, 207–227.

——, The effect of deficit finance on human capital, *National Tax Journal*, December 1995, *48* (4), 531–546.

LISTE DES DOCUMENTS DE TRAVAIL REALISES PAR LE CEPII[1]

N°	***Titre***	***Auteurs***
2002-13	Projections démographiques de quelques pays l'Union Européenne (Allemagne, France, Italie, Royaume-Uni, Pays-Bas, Suède)", R. Sleiman	Rakhsat Sleiman
2002-12	Regional Trade Integration in Southern Afric″	S. Chauvin & G. Gaulier
2002-11	Demographic Evolutions and Unemployment: an Analysis of French Labour Market with Workers Generations	J. Château, J.L. Guérin & F. Legros
2002-10	Liquidité et passage de la valeur	P. Villa
2002-09	Le concept de coût d'usage Putty-Clay des biens durables	M.G. Foggea & P. Villa
2002-08	Mondialisation et régionalisation : le cas des industries du textile et de l'habillement	M. Fouquin, P. Morand R. Avisse G. Minvielle & P. Dumont
2002-07	The Survival of Intermediate Exchange Rate Regimes	A. Bénassy-Quéré & B. Coeuré
2002-06	Pensions and Savings in a Monetary Union : An Analysis of Capital Flow	A. Jousten & F. Legros
2002-05	Brazil and Mexico's Manufacturing Performance in International Perspective, 1970-1999	N. Mulder, S. Montout & L. Peres Lopes
2002-04	The Impact of Central Bank Intervention on Exchange-Rate Forecast Heterogeneity	M. Beine, A. Benassy-Quéré, E. Dauchy & R. MacDonald
2002-04	The Impact of Central Bank Intervention on Forecast Heterogeneity	M. Beine, A. Benassy-Quéré, E. Dauchi & R. MacDonald
2002-03	Impacts économiques et sociaux de l'élargissement pour l'Union européenne et la France	M.H. Bchir & M. Maurel
2002-02	China in the International Segmentation of Production Processes	F. Lemoine & D. Ünal-Kesenci

[1] Working papers are circulated free of charge as far as stocks are available; thank you to send your request to CEPII, Sylvie Hurion, 9, rue Georges-Pitard, 75015 Paris, or by fax : (33) 01 53 68 55 04 or by e-mail Hurion@cepii.fr. Also available on: \\www.cepii.fr. Working papers with * are out of print. They can nevertheless be consulted and downloaded from this website.

[1] Les documents de travail sont diffusés gratuitement sur demande dans la mesure des stocks disponibles. Merci d'adresser votre demande au CEPII, Sylvie Hurion, 9, rue Georges-Pitard, 75015 Paris, ou par fax : (33) 01 53 68 55 04 ou par e-mail Hurion@cepii.fr. Egalement disponibles sur : \\www.cepii.fr. Les documents de travail comportant * sont épuisés. Ils sont toutefois consultable sur le web CEPII.

2002-01	Illusory Border Effects: Distance Mismeasurement Inflates Estimates of Home Bias in Trade	K Head & T. Mayer
2001-22	Programme de travail du CEPII pour 2002	
2001-21	Croissance économique mondiale : un scénario de référence à l'horizon 2030	N. Kousnetzoff
2001-20	The Fiscal Stabilization Policy under EMU – An Empirical Assessment	A. Kadareja
2001-19	Direct Foreign Investments and Productivity Growth in Hungarian Firms, 1992-1999	J. Sgard
2001-18	Market Access Maps: A Bilateral and Disaggregated Measure of Market Access	A. Bouët, L. Fontagné, M. Mimouni & X. Pichot
2001-17	Macroeconomic Consequences of Pension Reforms in Europe: An Investigation with the INGENUE World Model	Equipe Ingénue
2001-16*	La productivité des industries méditerranéennes	A. Chevallier & D. Ünal-Kesenci
2001-15	Marmotte: A Multinational Model	L. Cadiou, S. Dees, S. Guichard, A. Kadareja, J.P. Laffargue & B. Rzepkowski
2001-14	The French-German Productivity Comparison Revisited: Ten Years After the German Unification	L. Nayman & D. Ünal-Kesenci
2001-13*	The Nature of Specialization Matters for Growth: An Empirical Investigation	I. Bensidoun, G. Gaulier & D. Ünal-Kesenci
2001-12	Forum Economique Franco-Allemand - Deutsch-Französisches Wirtschaftspolitisches Forum, Political Economy of the Nice Treaty: Rebalancing the EU Council and the Future of European Agricultural Policies, 9th meeting, Paris, June 26th 2001	
2001-11	Sector Sensitivity to Exchange Rate Fluctuations	M. Fouquin, K. Sekkat, J. Malek Mansour, N. Mulder & L. Nayman
2001-10*	A First Assessment of Environment-Related Trade Barriers	L. Fontagné, F. von Kirchbach & M. Mimouni
2001-09	International Trade and Rend Sharing in Developed and Developing Countries	L. Fontagné & D. Mirza

2001-08	Economie de la transition : le dossier	G. Wild
2001-07	Exit Options for Argentina with a Special Focus on Their Impact on External Trade	S. Chauvin
2001-06	Effet frontière, intégration économique et 'Forteresse Europe'	T. Mayer
2001-05	Forum Économique Franco-Allemand – Deutsch-Französisches Wirtschaftspolitisches Forum, The Impact of Eastern Enlargement on EU-Labour Markets and Pensions Reforms between Economic and Political Problems, 8th meeting, Paris, January 16 2001	
2001-04	Discrimination commerciale : une mesure à partir des flux bilatéraux	G. Gaulier
2001-03*	Heterogeneous Expectations, Currency Options and the Euro/Dollar Exchange Rate	B. Rzepkowski
2001-02	Defining Consumption Behavior in a Multi-Country Model	O. Allais, L. Cadiou & S. Dées
2001-01	Pouvoir prédictif de la volatilité implicite dans le prix des options de change	B. Rzepkowski
2000-22	Forum Economique Franco-Allemand - Deutsch-Französisches Wirtschaftspolitisches Forum, Trade Rules and Global Governance: A long Term Agenda and The Future of Banking in Europe, 7th meeting, Paris, July 3-4 2000	
2000-21	The Wage Curve: the Lessons of an Estimation Over a Panel of Countries	S. Guichard & J.P. Laffargue
2000-20	A Computational General Equilibrium Model with Vintage Capital	L. Cadiou, S. Dées & J.P. Laffargue
2000-19	Consumption Habit and Equity Premium in the G7 Countries	O. Allais, L. Cadiou & S. Dées
2000-18	Capital Stock and Productivity in French Transport: An International Comparison	B. Chane Kune & N. Mulder
2000-17	Programme de travail 2001	
2000-16	La gestion des crises de liquidité internationale : logique de faillite, prêteur en dernier ressort et conditionnalité	J. Sgard
2000-15	La mesure des protections commerciales nationales	A. Bouët
2000-14	The Convergence of Automobile Prices in the European Union: An Empirical Analysis for the Period 1993-1999	G. Gaulier & S. Haller

2000-13*	International Trade and Firms' Heterogeneity Under Monopolistic Competition	S. Jean
2000-12	Syndrome, miracle, modèle polder et autres spécificités néerlandaises : quels enseignements pour l'emploi en France ?	S. Jean
2000-11	FDI and the Opening Up of China's Economy	F. Lemoine
2000-10	Big and Small Currencies: The Regional Connection	A. Bénassy-Quéré & B. Coeuré
2000-09*	Structural Changes in Asia And Growth Prospects After the Crisis	J.C. Berthélemy & S. Chauvin
2000-08	The International Monetary Fund and the International Financial Architecture	M. Aglietta
2000-07	The Effect of International Trade on Labour-Demand Elasticities: Intersectoral Matters	S. Jean
2000-06	Foreign Direct Investment and the Prospects for Tax Co-Ordination in Europe	A. Bénéssy-Quéré, L. Fontagné & A. Lahrèche-Révil
2000-05	Forum Economique Franco-Allemand - Deutsch-Französisches Wirtschaftspolitisches Forum, Economic Growth in Europe Entering a New Area?/The First Year of EMU, 6th meeting, Bonn, January 17-18, 2000	
2000-04*	The Expectations of Hong Kong Dollar Devaluation and their Determinants	B. Rzepkowski
2000-03	What Drove Relative Wages in France? Structural Decomposition Analysis in a General Equilibrium Framework, 1970-1992	S. Jean & O. Bontout
2000-02	Le passage des retraites de la répartition à la capitalisation obligatoire : des simulations à l'aide d'une maquette	O. Rouguet & P. Villa
2000-01*	Rapport d'activité 1999	
1999-16	Exchange Rate Strategies in the Competition for Attracting FDI	A. Bénassy-Quéré, L. Fontagné & A. Lahrèche-Révil
1999-15	Groupe d'échanges et de réflexion sur la Caspienne. Recueil des comptes-rendus de réunion (déc. 97- oct. 98)"	D. Pianelli & G. Sokoloff
1999-14	The Impact of Foreign Exchange Interventions: New Evidence from FIGARCH Estimations	M. Beine, A. Bénassy-Quéré &

		C. Lecourt
1999-13	Forum Economique Franco-Allemand - Deutsch-Französisches Wirtschaftspolitisches Forum, Reduction of Working Time/Eastward Enlargment of the European Union, 5 th meeting, Paris, July 6-7 1999	
1999-12*	A Lender of Last Resort for Europe	M. Aglietta
1999-11*	La diversité des marchés du travail en Europe : Quelles conséquences pour l'Union Monétaire ; Deuxième partie : Les implications macro-économiques de la diversité des marchés du travail	L. Cadiou, S. Guichard & M. Maurel
1999-10*	La diversité des marchés du travail en Europe : Quelles conséquences pour l'Union Monétaire ; Première partie : La diversité des marchés du travail dans les pays de l'Union Européenne	L. Cadiou & S. Guichard
1999-09	The Role of External Variables in the Chinese Economy; Simulations from a macroeconometric model of China	S. Dees
1999-08	Haute technologie et échelles de qualité : de fortes asymétries en Europe	L. Fontagné, M. Freudenberg & D. Ünal-Kesenci
1999-07	The Role of Capital Accumultion, Adjustment and Structural Change for Economic Take-Off: Empirical Evidence from African Growth Episodes	J.C. Berthélemy & L. Söderling
1999-06	Enterprise Adjustment and the Role of Bank Credit in Russia: Evidence from a 420 Firm's Qualitative Survey	S. Brana, M. Maurel & J. Sgard
1999-05	Central and Eastern European Countries in the International Division of Labour in Europe	M. Freudenberg & F. Lemoine
1999-04	Forum Economique Franco-Allemand – Economic Policy Coordination – 4 th meeting, Bonn, January 11-12 1999	
1999-03	Models of Exchange Rate Expectations: Heterogeneous Evidence From Panel Data	A. Bénassy-Quéré, S. Larribeau & R. MacDonald
1999-02	Forum Economique Franco-Allemand – Labour Market & Tax Policy in the EMU	
1999-01	Programme de travail 1999	

DOCUMENTS DE TRAVAIL / WORKING PAPERS

Si vous souhaitez recevoir des Documents de travail,
merci de remplir le coupon-réponse ci-joint et de le retourner à :

Should you wish to receive copies of the CEPII's Working papers,
just fill the reply card and return it to:

Sylvie HURION:
CEPII – 9, rue Georges-Pitard – 75015 Paris – Fax : 01.53.68.55.04

M./Mme / Mr./Mrs ....

Nom-Prénom / Name-First name ....

Titre / Title ....

Service / Department ....

Organisme / Organisation..

Adresse / Address...

Ville & CP / City & post code...
Pays / Country ....Tél. ....

Désire recevoir les **Document de travail** du CEPII n° - Wish to receive the **CEPII's Working Papers No**:..

....

....

....

....

....

....

....

....

....

....