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FORECASTS AND CONSTRAINTS ON POLICY ACTIONS: THE RELIABILITY OF ALTERNATIVE INSTRUMENTS[1]

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ABSTRACT

Multipliers are often used for selecting alternative policies in economic planning and forecasting. Particular variables like employment, trade balance, inflation or government budget usually impose constraints on the policy action. Therefore a criterion to be preferred to the raw multiplier should be a *trade-off* criterion which measures the effect of a variation of the instrument associated with a given cost on government budget, trade balance, etc. The *trade-off* criterion computed from a macroeconomic model is obviously affected by uncertainty to some extent; a criterion which appears to be strongly effective might at the same time be affected by such an high degree of uncertainty as to recommend against its use. The problem of uncertainty due to estimation errors will be investigated in this paper through experiments on the Mini-DMS model of the French economy.

[1] The research underlying this paper has been carried out in partial fulfillment of a joint research project between INSEE and the IBM Scientific Center of Pisa. Some results concerning the government budget constraint were presented at *The Fifth World Congress of the Econometric Society*, M.I.T., Cambridge, MA, August 17-24, 1985. In this paper the analysis is extended to constraints imposed by the trade balance, employment and inflation rate. Comments are welcome.

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CONTENTS

1. INTRODUCTION

The analysis of multipliers calculated from a large scale macroeconomic model is usually the first step in the process of evaluating policy actions. A large value of a multiplier, with the right sign, suggests that the policy instrument should be very effective in moving up or down the given target variable. A rough analysis should therefore recommend the use of those instruments that exhibit large multipliers (provided that appropriate scale adjustment have been made, in such a way that the policy maker can recognize when a multiplier is small or large).

Some particular endogenous variables, however, usually impose constraints on the policy action. Typical cases are the government budget, the trade balance, unemployment, the rate of inflation, or others.

The raw multiplier $\pi=\partial y/\partial x$ measures the effect on the target variable y of a unit change in the instrument x, and does not take into account the cost that the action may have on the constraint variables, like government budget, etc. It should therefore be more interesting for the policy maker a *trade-off* criterion which measures the effect of a variation of the instrument associated with a given cost in terms of government or trade balance, inflation, etc.: in other words a *trade-off* criterion $\pi/\pi_k = (\partial y/\partial x)/(\partial y_k/\partial x)$ where x is the instrument, y is the target endogenous variable which we want to modify and y_k is the constraint variable.

Computation does not raise particular difficulties: for a linear model the *trade-off* criterion is simply the ratio of two reduced form coefficients; for a nonlinear model it is the ratio of two impact multipliers,

each of which can simply be computed using finite differences as in Evans and Klein (1968, p.49); extension to the multiperiod dynamic case is straightforward (sustained multipliers). The larger the *trade-off* criterion, the more effective is expected to be the policy action.

Effectiveness cannot, however, be the only guideline for the decision maker. Being risk averting, he will certainly be concerned with the problem of reliability of the instrument he is using. The *trade-off* criterion which is computed from the macroeconomic model is obviously affected by uncertainty to some extent; a criterion which appears to be strongly effective might at the same time be affected by such an high degree of uncertainty as to recommend against its use.

The problem of uncertainty, which depends both on the numerator and the denominator of the *trade-off* criterion, has been investigated by the authors (1985) through experiments on the Mini-DMS model of the French economy (see Fouquet et. al., 1978, and Brillet, 1981) for the case of the government budget constraint. The results seemed able to give to the policy maker indications much more practical and simple than those obtained from analysing the raw multipliers as in a previous work of the authors (1984).

In this paper we shall extend the analysis to four constraint variables: government budget, trade balance, unemployment and inflation rate. In particular, the government budget will receive a different treatment with respect to the previous paper (Bianchi, et al., 1985): the constraint will be given by the cost for the government budget *measured in points of GDP*, rather than the cost in absolute value.

Two of the most interesting ways the results can be used are the following:

1) We can consider the *trade-offs* associated with government deficit and one particular target variable. First we get, through the point estimate of the *trade-offs*, a rank order on the average effectiveness of each instrument (provided they are effective, having the right sign); then we see for which instruments the effectiveness can be considered significant, and what changes on the rank ordering are induced by replacing the point estimate by a guaranteed value which takes into account the dispersion (e.g. the lower bound of a confidence interval).
2) We can observe the set of *trade-offs* associated with one particular instrument, looking at which ones can be considered significant, and compare them with the multipliers associated with the same targets. The introduction of the government balance in most cases considerably increases the uncertainty; the increase appears to be even larger than what we would expect from the assumption of independence between the two multipliers, thus suggesting that correlation among multipliers should be taken carefully into account.

When the policy is sustained for several periods (years), the *trade-off* analysis must consider the cumulated or sustained effects of the policy actions over the multiple periods. In this context two major points could be focussed: some instruments become less reliable and the rank order of the instruments is not the same as in the one-period (impact) case.

2. TRADE-OFFS AND EFFECTIVENESS OF POLICY ACTIONS

We begin with examination of the problem in case of a linear system of simultaneous equations. Let the model be

$$(1) \qquad Ay_t + Bx_t = u_t \qquad\qquad t = 1,2,\ldots,T$$

where y_t is the $m \times m$ vector of endogenous variables at time t, x_t is the $m \times n$ vector of predetermined variables and u_t is the $m \times 1$ vector of random error terms at time t.

Provided that the system satisfies standard regularity conditions, we may get estimates of the $m \times m$ and $m \times n$ matrices of structural coefficients, $\hat{A}$ and $\hat{B}$, such that asymptotically for $T \to \infty$

$$(2) \qquad \sqrt{T} \begin{bmatrix} vec\,(\hat{A} - A) \\ vec\,(\hat{B} - B) \end{bmatrix} \sim N(0, \Psi).$$

The reduced form of the system is

$$(3) \qquad y_t = \Pi x_t + v_t; \qquad \Pi = -A^{-1}B; \qquad v_t = A^{-1}u_t$$

and if the j-th predetermined variable, x_{jt}, is a policy instrument, the i,j-th element of the matrix Π is the impact multiplier of such an instrument with respect to the target (i-th) endogenous variable: $\pi_{ij} = \partial y_{it} / \partial x_{jt}$. Let us indicate with y_{kt} the constraint variable under examination (government budget, trade balance, etc.): $\pi_{kj} = \partial y_{kt} / \partial x_{jt}$ will be the related multiplier.

If our policy action moves the instrument x_{jt}, the expected change in the target endogenous corresponding to an expected unit change in the constraint variable is the *trade-off*

$$(4) \qquad \pi_{ij} / \pi_{kj} = \left(\sum_w a^{iw} b_{wj} \right) / \left(\sum_w a^{kw} b_{wj} \right).$$

For example, if the target variable is the added value (Q, see section 5) and the constraint is the government budget (measured in points of the gross domestic product, CFG/PIB), the *trade-off* in the one-period case at 1981 (apart from the scaling factor given by a power of 10) is *-1.58* for the instrument TACP (VAT rate on consumption), and *-1.04* for the instrument AG (government consumption and investment, see the first table in section 5.2). The negative sign indicates that in both cases to increase the added value there will be a cost for the government budget (an increase of the deficit). The numerical values, more than separately, are interesting in relative terms, since they are already scaled and comparable: for the same cost in terms government deficit, the gain in the added value moving TACP is 50% larger than moving AG.

3. RELIABILITY OF THE INSTRUMENTS

Being the structural form coefficients usually unknown, the policy action must be based on the available estimates of coefficients and corresponding *trade-offs* $\hat{\pi}_{ij} / \hat{\pi}_{kj}$. Investigating the exact distribution of these estimates in small samples is presumably very hard. We can, however, obtain a large sample approximation by resorting to a well known and widely adopted theorem on the limiting distribution of sample statistics (δ-method, see Rao, 1973, p.388): given (2), the estimate of the *trade-off* will be asymptotically normally distributed as

$$(5) \qquad \sqrt{T} \left(\hat{\pi}_{ij} / \hat{\pi}_{kj} - \pi_{ij} / \pi_{kj} \right) \sim N(0, g' \Psi g)$$

g being the vector of first order derivatives of the *trade-off* with respect to the vector of structural coefficients

$$(6) \qquad g = \begin{bmatrix} \partial(\pi_{ij}/\pi_{kj}) \,/\, \partial(vec\ A) \\ \partial(\pi_{ij}/\pi_{kj}) \,/\, \partial(vec\ B) \end{bmatrix}.$$

Reminding the expression of the *trade-off* given in (4), the elements of the above vector of first derivatives can be computed as follows:

$$(7)\qquad \partial(\pi_{ij}/\pi_{kj})/\partial a_{pq} = (1/\pi_{kj}^2).[(\partial\pi_{ij}/\partial a_{pq})\pi_{kj} - (\partial\pi_{kj}/\partial a_{pq})\pi_{ij})]$$

$$= (\sum_w a^{jp}a^{qw}b_{wj})/\pi_{kj} - (\pi_{ij}/\pi_{kj}^2)\sum_w a^{kp}a^{qw}b_{wj}$$

$$= -(\pi_{qj}/\pi_{kj})a^{jp} + (\pi_{ij}\pi_{qj}/\pi_{kj}^2)a^{kp}$$

and

$$(8)\qquad \partial(\pi_{ij}/\pi_{kj})/\partial b_{rs} = (1/\pi_{kj}^2).[(\partial\pi_{ij}/\partial b_{rs})\pi_{kj} - (\partial\pi_{kj}/\partial b_{rs})\pi_{ij})]$$

$$= \begin{cases} 0 & [\text{if } s \neq j] \\ (1/\pi_{kj}^2).(\pi_{ij}a^{kr} - \pi_{kj}a^{jr}) & [\text{if } s = j]. \end{cases}$$

We may compute (7) and (8) at $(\hat{A},\hat{B})$, then order them in a column vector $\hat{g}$ as in (6). Then, according to (5), we may compute $\hat{\sigma}_{ijk}=(\hat{g}'\hat{\Psi}\hat{g}/T)^{\frac{1}{2}}$ as an estimate of the asymptotic standard error of the *i,j,k-th trade-off* (y_i is the target, x_j is the instrument, y_k is the constraint).

Extension to nonlinear models is straightforward using numerical simulation: carefully selected finite differences, as in Bianchi et al. (1981), allow the computation of the *trade-offs* and of their asymptotic variances and standard errors. It must be remarked that $\hat{\Psi}/T$ is a standard outcome of system estimation methods. For example, in case of FIML estimation, $\hat{\Psi}/T$ may be the inverse of the Hessian (with minus sign) of the concentrated log-likelihood, calculated at the point which maximizes the likelihood. When limited information estimation methods are applied, as in our case, this matrix must be built block by block, after coefficients have been estimated. Of course, according to the representation (6), since $\hat{A}$ and $\hat{B}$ include restricted structural coefficients (zeroes and ones, for example), $\hat{\Psi}/T$ would be a very large but sparse matrix. If we consider only the coefficients of the model

which must be estimated, the matrix becomes a smaller full (but not necessarily full rank) matrix. In our case, Mini-DMS for the French economy model involves *155* unknown structural coefficients, so that $\hat{\Psi}/T$ is a *155×155* full matrix (symmetric, of course). Unknown coefficients and the blocks of their asymptotic covariance matrix have been computed as in Brundy and Jorgenson (1971, p.215).

Let us now suppose to perform a simple policy experiment. The policy maker aims at changing the target y_{it} moving the instrument x_{jt}, without forgetting that his action will also change the constraint variable (in the example given at the end of the previous section, the action will presumably have a cost for the government budget). He will first check if the estimated multiplier, $\hat{\pi}_{ij}$, has the *right* sign. Also the estimate of the multiplier of x_{jt} with respect to the constraint variable $\hat{\pi}_{kj}$ must have the *right* sign, otherwise the model cannot be considered an appropriate tool for evaluating the effects of the planned policy action.

If both conditions are fulfilled, the policy maker will consider the point estimate $\hat{\pi}_{ij}/\hat{\pi}_{kj}$ as an average *trade-off* between the (expected) gain in the target and the (expected) loss for the constraint variable: or, in other words, as the expected gain in the target corresponding to a unit loss for the constraint variable. However, he cannot trust completely on $\hat{\pi}_{ij}/\hat{\pi}_{kj}$, since it is affected by errors in the estimated coefficients. To get some indication about the guaranteed effectiveness of the policy action he will build a confidence interval around the available estimate of the *trade-off* (for example using $\pm\sigma_{ijk}$ if he is only moderately risk averting, $\pm 2\sigma_{ijk}$ if he needs stronger warranties). If the confidence interval does not include the zero point (that is the *trade-off* is significantly non-zero), the lower bound (in absolute value) of the interval will indicate to the policy maker some kind of minimum guaranteed effectiveness of his policy action.

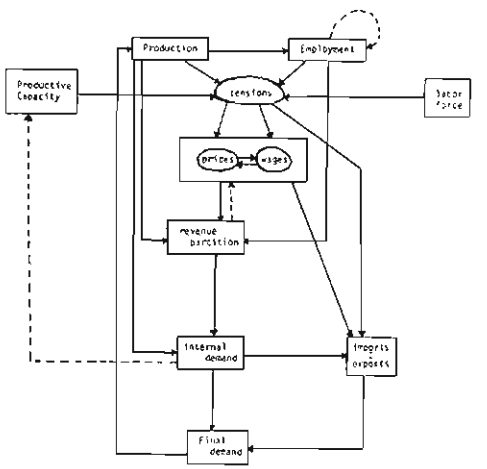
For example, let us again look at the first table of section 5.2, and

add $2\sigma_{ijk}$ to the estimated *trade-offs* between the target Q (added value) and the constraint CFG/PIB (government budget measured in points of GDP), which have the negative sign. We obtain in this way a lower bound (in absolute value) for some sort of confidence interval for the *trade-off* criteria. Apart from the scaling factor given by a power of 10, we get *-0.75* for the instrument AG (government consumption and investment) and *-0.53* for the instrument TACP (VAT rate on consumption). If we assume that our lower bound represents a kind of minimum guaranteed effectiveness of the policy action, it follows that the risk averting policy maker might rely on AG more than TACP. Instruments ordered according to their *minimum guaranteed efficiency* may exhibit a rank order different from the case in which uncertainty had not been considered.

4. THE FRENCH MODEL USED IN THE EXPERIMENTS

The Mini-DMS model (Brillet 1981) constitutes a smaller version of the Dynamic Multi Sectorial model of the French economy (Fouquet et al., 1978) built in 1974-1976 at INSEE (National Institute for Statistics and Economic Studies) to be used as a medium term forecasting tool, in particular for national planning studies conducted through the Commissariat General au Plan (General Planning Agency). Largely reduced in size (the present version contains 235 equations, 71 of which are behavioral, as compared to more than 2400 for the larger version) Mini-DMS nevertheless preserves the same economic structure as well as most of the theoretical mechanism of the original model. The economic equilibrium is reached through two simultaneous iterative processes: a

Keynesian process on demand (a given value of demand induces a level of production from which a new value is determined as the given of its individual elements) and the price wage rate loop.



SIMPLIFIED ARCHITECTURE OF THE MINI-DMS MODEL

(dotted lines are associated with lagged iteration)

Fig. 1

The figure gives a very schematic view of the process: from final demand the model deduces production and desired employment level, to which the effective level adjusts only partially; comparison between availabilities (predetermined production capacity, labor force, job supply) and the quantities actually used produces disequilibrium or tension variables, which determine the level reached by the iterative loop between wage rate and price index; the subsequent partition of the revenue

between business firms and households gives their respective demand elements: investment (through an accelerator-profit formulation) and consumption, thus global domestic demand which, corrected of the external trade elements (influenced, besides demand itself, by available productive capacity and competitiveness), produces a new value for final demand, allowing a reinitialization of a process which hopefully leads to an equilibrium value after some iterations.

In its present state, the Mini-DMS model can be considered as being half way between an operational-forecasting tool: its acceptable forecasting qualities, as well as its rather detailed set of decisional variables, can lead to its use for simple enough macro-economic studies, and for carrying out mathematical economic experiments, some of which have already been made in the near past, concerning in particular multiplier analysis, optimal control problems or dynamic properties of alternate formulations.

Estimates of the structural coefficients the model have been obtained by means of a straightforward extension of Brundy and Jorgenson's (1971) instrumental variables method (limited information) to the case of nonlinear models. The method has been applied iteratively, till convergence has been reached, so that the final estimates of coefficients are not affected by the choice of the initial coefficients values. In each iteration, the instrumental variables are computed as deterministic solution values of the system (which is the simplest choice, although not the *best* in the class of nonlinear estimators as well explained in Amemiya, 1983). Since the number of stochastic equations in the model is considerably larger than the sample period length, the estimate of the covariance matrix of the disturbance process would be singular, and the standard system estimation methods could not be applied.

5. EFFECTIVENESS VERSUS RELIABILITY: IMPACT EFFECT

We consider in this and in the following sections the *trade-offs* between four constraint variables and the main target endogenous variables of the model, using eight possible instruments:

TCSS	= social security rate for workers
AG	= government consumption and investment
TCSE	= social security rate for business firms
TACP	= VAT rate on consumption
TAI	= VAT rate on investment.
XTM	= tax rate on household revenue
XPSOCT	= social benefits
XIS	= tax rate on business firms profits.

Each group of results in the tables below is related to one of the main macroeconomic endogenous variables (targets):

Q	= added value
C	= consumption
I	= investment
M	= imports
X1	= exports
PDRE	= unemployment
Q1	= added value sector 1 (industrial sector)
Q2	= added value sector 2 (nonindustrial sector)
PC	= consumption prices
CFG	= government budget
CFX	= trade balance.

Among the four constraint variables, the government budget (CFG) will be treated in two different ways: in absolute terms, and measured in points of the gross domestic product. The constraint variables will therefore be the following.

CFG = government budget
CFG/PIB = government budget measured in points of GDP
CFX/PIB = trade balance measured in points of GDP
PDRE = unemployment
ΔPC = annual percentage change of consumption prices (inflation rate).

We are first considering the impact effect of one-period policy action. 1981 has been chosen, being the first year outside the sample estimation period (1962-1980).

5.1. Government budget constraint

Trade-off criteria are displayed in the tables with their sign. A negative sign, as for the case of the added value (Q), indicates that a policy action which is expected to increase the target is also expected to lower the government budget (that is to increase the public deficit). A positive sign indicates that a decrease in the target is expected to be accompanied by a decrease in the government budget (that is still an increase of the deficit).

These tables are completed by histograms allowing a visual comparison of the *trade-off* values, stressing in particular the evolution of their rank order when uncertainty is considered.

Using the same data as the associated tables, they display the point estimate of the *trade-offs* as the top of the blank surface, the same value minus one standard error as the top of the light surface, and the same value minus two standard errors as the top of the black surface (the sign can change from one value to another).

First, let us consider the point estimates of the *trade-offs*: we can

Trade-off between Q (added value) and CFG (government budget).
Impact *trade-off* at 1981

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.089	6	.024	-3.69	-.065	6	-.041	7
AG	-.372	3	.043	-7.49	-.279	3	-.236	1
TCSE	-.542	2	.218	-2.49	-.324	2	-.106	4
TACP	-.570	1	.215	-2.65	-.355	1	-.140	2
TAI	-.237	4	.052	-4.56	-.185	4	-.133	3
XTM	-.089	5	.024	-3.69	-.065	5	-.041	6
XPSOCT	-.089	7	.024	-3.68	-.065	7	-.040	8
XIS	-.070	8	.014	-5.00	-.036	8	-.042	5

Trade-off between C (consumption) and CFG (government budget).
Impact *trade-off* at 1981

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.186	5	.052	-3.60	-.134	5	-.082	5
AG	-.097	7	.019	-5.21	-.079	7	-.060	7
TCSE	-.394	2	.144	-2.74	-.251	2	-.107	3
TACP	-.582	1	.180	-3.24	-.403	1	-.223	1
TAI	-.218	3	.034	-6.41	-.184	3	-.150	2
XTM	-.187	4	.052	-3.60	-.135	4	-.083	4
XPSOCT	-.185	6	.052	-3.59	-.134	6	-.082	6
XIS	-.027	8	.006	-4.36	-.021	8	-.015	8

Trade-off between I (investment) and CFG (government budget).
Impact *trade-off* at 1981

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.018	7	.006	-2.99	-.012	7	-.006	7
AG	-.066	5	.019	-3.48	-.047	5	-.028	5
TCSE	-.277	2	.113	-2.45	-.164	2	-.051	4
TACP	-.285	1	.117	-2.44	-.168	1	-.051	3
TAI	-.123	4	.031	-3.94	-.091	4	-.060	2
XTM	-.018	6	.006	-2.99	-.012	6	-.006	6
XPSOCT	-.018	8	.006	-2.99	-.012	8	-.006	8
XIS	-.152	3	.025	-6.08	-.127	3	-.102	1

Trade-off between M (imports) and CFG (government budget)
Impact *trade-off* at 1981

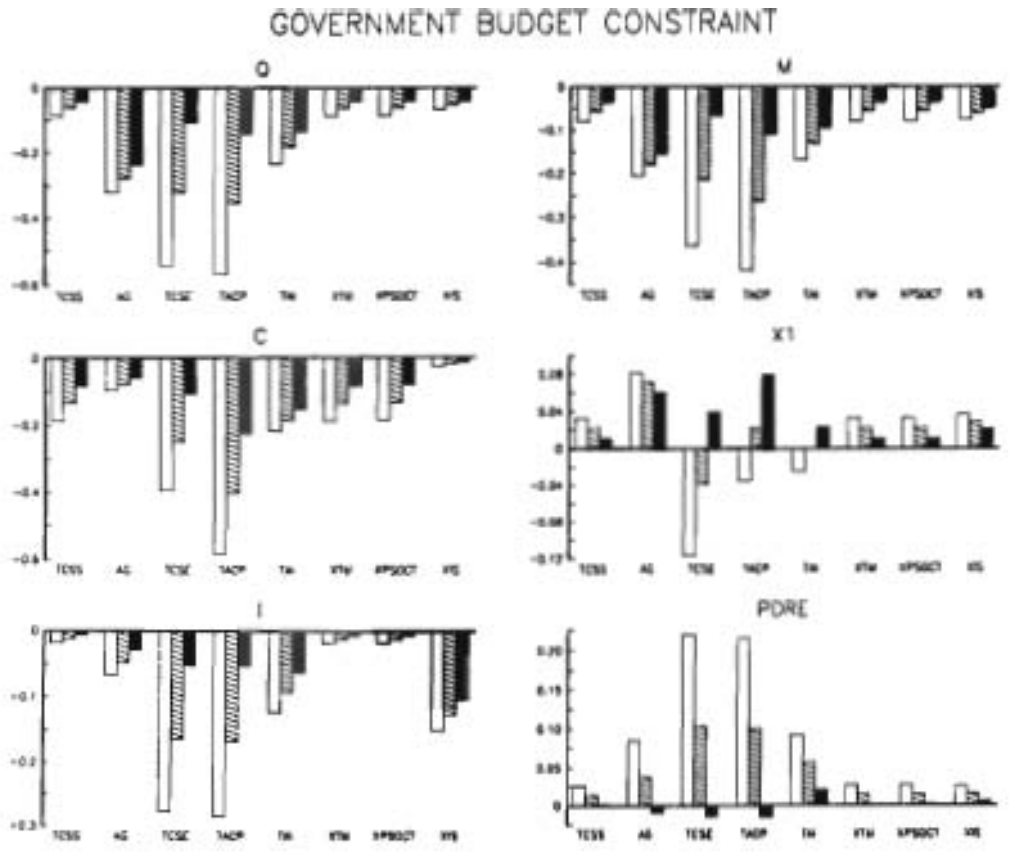
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.082	6	.023	-3.61	-.059	7	-.036	7
AG	-.209	3	.027	-7.62	-.181	3	-.154	1
TCSE	-.366	2	.149	-2.45	-.216	2	-.067	4
TACP	-.422	1	.156	-2.71	-.266	1	-.111	2
TAI	-.171	4	.038	-4.52	-.133	4	-.095	3
XTM	-.082	5	.023	-3.61	-.060	6	-.037	6
XPSOCT	-.092	7	.023	-3.60	-.059	8	-.036	8
XIS	-.079	8	.014	-5.82	-.066	5	-.052	5

Trade-off between X1 (exports) and CFG (government budget).
Impact *trade-off* at 1981

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	.033	.	.011	3.10	.022	.	.012	.
AG	.082	.	.011	7.38	.071	.	.059	.
TCSE	-.117	.	.078	-1.49	-.039	.	.040	.
TACP	-.035	.	.057	-.61	-.022	.	.079	.
TAI	.025	.	.024	1.05	.001	.	.023	.
XTM	.033	.	.011	3.10	.023	.	.012	.
XPSOCT	.033	.	.011	3.10	.022	.	.012	.
XIS	.037	.	.008	4.87	.030	.	.022	.

Trade-off between PDRE (unempl.) and CFG (government budget).
Impact *trade-off* at 1981 (×10³)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	.026	6	.012	2.11	.014	7	.001	.
AG	.085	4	.047	1.81	.038	4	-.009	.
TCSE	.220	1	.117	1.87	.103	1	-.015	.
TACP	.215	2	.115	1.87	.100	2	-.015	.
TAI	.092	3	.036	2.54	.056	3	.019	.
XTM	.026	5	.012	2.11	.014	6	.001	.
XPSOCT	.026	7	.012	2.11	.014	8	.001	.
XIS	.025	8	.010	2.42	.014	5	.004	.



Trade-off between Q (added value) and CFG (government budget). Impact trade-off at 1981

	Trade-off	Rank order	Stand. error (±)	t-ratio	Trade-off *σ	Rank order	Trade-off *2σ	Rank order
TCSS	-.089	6	.024	-3.69	-.065	6	-.091	7
AG	-.307	3	.043	-7.48	-.279	3	-.236	1
TCSE	-.342	2	.218	-2.89	-.324	2	-.196	4
TACP	-.378	1	.215	-2.63	-.355	1	-.140	5
TAI	-.232	4	.032	-6.50	-.185	4	-.133	6
KTM	-.169	5	.024	-3.69	-.065	5	-.041	4
KPSOCT	-.069	7	.024	-3.66	-.060	7	-.040	8
KIS	-.070	8	.014	-5.00	-.058	8	-.042	3

Trade-off between Q1 (added value-industrial) and CFG (government budget). Impact trade-off at 1981

	Trade-off	Rank order	Stand. error (±)	t-ratio	Trade-off *σ	Rank order	Trade-off *2σ	Rank order
TCSS	.020	7	.006	-3.15	-.014	1	-.007	3
AG	-.055	4	.015	-3.54	-.035	4	-.024	4
TCSE	-.140	1	.102	-1.39	-.138	1	-.035	2
TACP	-.222	2	.083	-2.38	-.129	2	-.035	1
TAI	-.067	3	.025	-2.85	-.072	3	-.047	5
KTM	-.030	6	.006	-3.15	-.014	6	-.007	6
KPSOCT	-.030	8	.006	-3.15	-.014	8	-.007	8
KIS	-.024	5	.006	-3.98	-.018	5	-.012	5

Trade-off between Q2 (added value-nonindustrial) and CFG (government budget). Impact trade-off at 1981

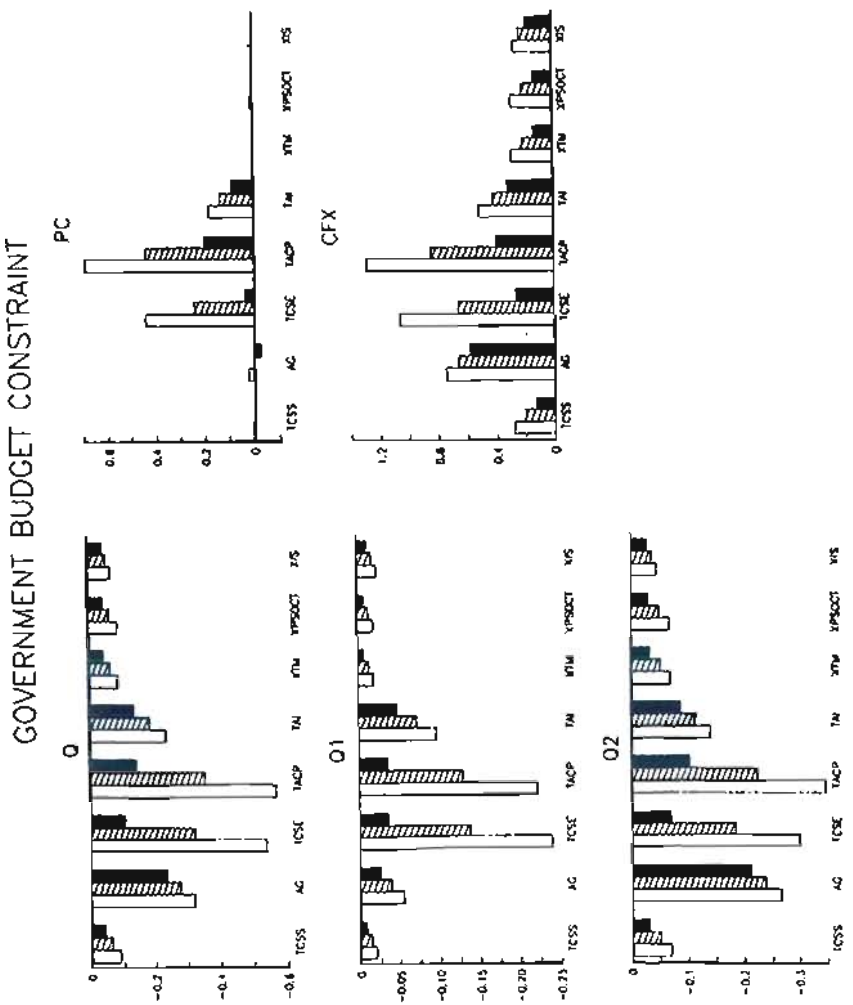
	Trade-off	Rank order	Stand. error (±)	t-ratio	Trade-off *σ	Rank order	Trade-off *2σ	Rank order
TCSS	-.069	6	.019	-3.63	-.050	6	-.031	6
AG	-.267	3	.026	-9.49	-.238	1	-.211	1
TCSE	-.301	2	.118	-2.59	-.189	3	-.069	4
TACP	-.348	1	.134	-3.83	-.224	2	-.101	3
TAI	-.140	4	.026	-5.04	-.112	4	-.054	5
KTM	-.039	5	.019	-3.63	-.030	5	-.031	7
KPSOCT	-.069	7	.019	-3.63	-.030	7	-.031	8
KIS	-.046	8	.008	-5.58	-.037	8	-.028	8

Trade-off between PC (consumption prices) and CFG (government budget). Impact trade-off at 1981 ($\times 10^3$)

	Trade-off	Rank order	Stand. error (±)	t-ratio	Trade-off *σ	Rank order	Trade-off *2σ	Rank order
TCSS	.006	7	.002	.82	-.001	6	-.009	
AG	.003	4	.005	.89	-.003	8	-.009	
TCSE	.438	2	.359	2.18	.233	2	.037	
TACP	.655	1	.346	3.79	.439	1	.134	
TAI	.111	3	.047	3.89	.130	3	.064	
KTM	.006	6	.002	.61	-.001	5	-.008	
KPSOCT	.006	8	.002	.86	-.001	7	-.008	
KIS	.007	5	.002	.94	-.000	4	-.008	

Trade-off between CFX (trade balance) and CFG (government budget). Impact trade-off at 1981

	Trade-off	Rank order	Stand. error (±)	t-ratio	Trade-off *σ	Rank order	Trade-off *2σ	Rank order
TCSS	.285	6	.078	3.67	.207	7	.129	7
AG	.148	7	.054	2.80	.094	8	.050	8
TCSE	1.061	1	.400	2.65	.661	1	.260	1
TACP	1.296	2	.450	2.88	.846	2	.396	2
TAI	.518	4	.101	5.14	.417	4	.316	4
KTM	.287	5	.078	3.68	.208	6	.130	6
KPSOCT	.284	8	.078	3.65	.206	5	.128	5
KIS	.265	8	.045	5.92	.220	3	.176	3



see that, whatever the instruments used, the sign of the *trade-off* is almost always the same, and that it can be considered as coherent with common sense; one has to spend (in terms of *government balance* CFG) to increase *consumption* (C) or *investment* (I). One also has to spend to decrease *prices* (PC), whether price decrease comes from firms behavior or from the direct effect of a decrease of the added value tax component (TACP or TAI). On the whole, *government spending* always increases *activity* (Q) and *employment*, but also *imports* (M). As to *exports* (X1), *trade-offs* show a variable sign. If government action primarily increases demand, exports decrease (due to an inflationary effect, and to the rising tensions on internal production capacity). But if government action primarily decreases prices, exports increase (due to the growth of price competitiveness of French firms). Lastly, the value obtained for *trade balance* shows that each time the use of an instrument increases *government deficit*, it also has a negative effect on *trade balance*.

So, according to the model, whichever instrument is used, *government spending* affects all the elements of the macroeconomic equilibrium in the same direction; but we can also see that the level of the effect is quite variable; we will now try to explain its rank order.

First, one simplifying remark: the instruments affecting directly household revenue -*social benefits* (XPSOCT), *social securities paid by workers* (TCSS), *income tax* (XTM)- have a value so similar in all cases that they can be treated as a single instrument: this could be expected. The tables show that the second order effects are not significant

Now, if we first consider *global activity* (Q) we can see that the most efficient instruments (in terms of *government spending*) are clearly the ones concerning *prices* (the VAT rates and the social securities of the firms) and *government demand*: then we find the ones affecting *households*, then *taxes on profits*. This rank order is better explained using the different elements of demand

- *Investment*, influenced by the profit rate, is mostly affected by the decrease of firms taxes, but also by the increase in demand on which government spending is more efficient then increasing household revenue.
- Indeed, the increase in *household consumption* through household revenue does not appear very efficient, and it seems better to work through VAT rate on consumption (this looks normal) but also through TCSE, which has only indirect effects, but very important ones, through an increase in employment. The most important explanation for this apparent anomaly is the evolution of the savings ratio: when their revenue increases, households tend to save a larger share of their income, and when prices decrease, they lower their saving level as their notion of savings is in real terms.
- As we have seen, the instrument affecting *prices* (TCSE, TACP and TAI) have a positive effect on exports, and the others a negative one.
- Concerning *prices*, we can see that the demand-side instruments have a negligible influence, while the influence of the others is either direct (for the VAT rates, TACP and TAI) or through the wage cost (TCSE, but also TACP, as wages are indexed on the consumption prices). The effect of XIS and TAI on the profits rate will only come into play in the following year due to the lagged influence of this variable.
- As to *trade balance* (CFX), its negative variation is explained by the increase in internal activity, whether it comes from a direct increase in demand or from the decrease of prices.

Now, reminding that the object of this study is the uncertainty of these *trade-offs*, we first have to set a criterion for the acceptability of their sign: similarly to the *t-statistic* used for the regressions, we shall assume that a *trade-off* is significantly different from zero if its value is more than double its estimated standard error. In that light we can observe that each instrument presents a significant *trade-off* between *government budget* and *demand*, even considering each of its products (industrial or non-industrial) or each of its elements (consumption, investment, imports), except for exports where the instruments increasing exports through price competitiveness show a significant probability of having the opposite effect. Indeed, the *trade-off* with prices themselves, although it could be considered significant, appeared to be much affected by uncertainty. This comes mostly from the use of *trade-offs* instead of multipliers: the uncertainty of the influence of *supply-side* instruments on *government deficit* itself is much higher than for demand-side ones as a change in the price level has an important impact on a balance measured in nominal terms.

The main conclusion: demand-side instruments have a much higher precision concerning their *trade-off* between *government budget* and any macroeconomic target. This will serve as guideline for the observation of the way the rank order among instruments evolves when one considers, instead of the *trade-off*, a "*guaranteed value*" obtained by subtracting from the (absolute value of the) point estimate either one or two standard errors. We then can see that we can separate the eight instruments in four groups: *supply-side* instruments (TCSE, TACP, TAI), *demand-side* ones concerning either households (TCSS, XPSOCT, XTM) or *Government* (AG), with a special comment for XIS which affects mostly the equilibrium in the following period of time.

First, if we consider *activity*, we see that the priority of *supply-side instruments* over *government demand* becomes less and less evident, this instruments becoming, at 2σ level, the most efficient, while the higher precision of TAI, which works through profits ratio rather than through prices (it can then be considered somewhat as a demand-side instrument working through investment) tends to make it the most efficient between the ones affecting firms. In the same way, XIS becomes more efficient than instruments affecting household revenue, which are affected,

concerning their influence on demand, by the uncertainty on the savings ratio.

These remarks are confirmed (and completed) if we separate demand into products: although the higher influence of AG on non-industrial demand can make it especially efficient on Q2, and the supply-side instruments stay the most efficient on industrial activity. Concerning the components of demand, we can see that:

- For *investment* the highest guaranteed efficiency is that of XIS (which affects profits directly, and in a sure manner), followed by the VAT rate on investment itself.
- For *consumption* the superiority of supply-side instruments is still confirmed, but with a much lower margin, and TAI becoming relatively more efficient (we can also remark that TAI affects household investment in lodgings which is not subject to the uncertainty on the savings ratio, as it is intermediate between consumption and savings).
- For *exports*, as we have seen, the significance of the supply-side instruments is not ensured, while the others are comparable (negatively) among themselves; indeed for TCSE and TACP, they could show a negative efficiency higher than the one of the demand-side instruments.
- The higher precision of TAI reflects itself also for *prices*, with a guaranteed efficiency higher than that of TCSE; but although the efficiency of supply-side instruments is much reduced, it stays of course at a level certainly higher than that of the other instruments.
- As to *trade balance* (as well as *imports*) its rank order, whatever the level of uncertainty we consider, remains exactly the same as that of demand in accordance with the observations made above. Indeed the study of the model shows that demand has a quite precise effect on *trade balance* measured in real terms, while a decrease of prices, associating an improvement of the trade balance in real terms with a bigger deflationary effect on export prices than on imports prices, has an uncertain influence on the nominal value.

5.2. Government budget constraint (measured in points of GDP)

We repeat in this section the computations related to the government budget constraint. The difference with respect to the previous section is that now we use in the denominator the constraint variable CFG/PIB, that is the government budget measured in points of GDP. This should make the results less dependent on the basic solution; in particular, the direct influence of deflationary instruments on the government budget should no longer depend on its sign. We shall then concentrate our comments on the evolution from the previous results.

Concerning the point estimates, the results do not seem much changed: the sign stays the same, showing that whatever instrument we use, we always have to spend in terms of government budget to increase any part of activity (thus increase employment and decrease inflation), the only exception being exports (decreased by a demand-side spending, increased by a supply-side one). Prices still decrease with spending, the sign in the demand-side case being explained by the temporary rise in productivity due to the inertia of employment.

As to the hierarchy, it does not change either. The three instruments influencing activity through household revenue (TCSS, XTM, XPSOCT) show almost equal values. On global activity, AG is a little more efficient, not being affected by the high savings ratio on marginal income, and can compete with the supply side instruments: TCSE, TACP, TAI in showing the most favorable *trade-off* (XIS which in the short term influences only, through the profits ratio, an investment still unproductive, can be

Trade-off between Q (added value) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	-0.28	6	0.08	-3.67	-0.21	6	-0.13	7
AG	-1.04	3	0.14	-7.28	-0.90	3	-0.75	1
TCSE	-1.56	2	0.57	-2.76	-0.99	2	-0.43	3
TACP	-1.58	1	0.52	-3.02	-1.06	1	-0.53	2
TAI	-0.71	4	0.15	-4.72	-0.56	4	-0.41	4
XTM	-0.28	5	0.08	-3.67	-0.21	5	-0.13	6
XPSOCT	-0.28	7	0.08	-3.66	-0.20	7	-0.13	8
XIS	0.22	8	0.05	-4.86	-0.17	8	-0.13	5

Trade-off between C (consumption) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	-0.59	5	0.16	-3.60	-0.43	5	-0.26	5
AG	-0.31	7	0.06	-5.18	-0.25	7	-0.19	7
TCSE	-1.13	2	0.37	-3.06	-0.76	2	-0.39	3
TACP	-1.62	1	0.43	-3.77	-1.19	1	-0.76	1
TAI	-0.65	3	0.10	-6.68	-0.55	3	-0.46	2
XTM	-0.59	4	0.17	-3.60	-0.43	4	-0.26	4
XPSOCT	-0.59	6	0.16	-3.59	-0.42	6	-0.26	6
XIS	-0.09	8	0.02	-4.31	-0.07	8	-0.05	8

Trade-off between I (investment) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade -off	Rank order	Stand error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	-0.58	7	0.20	-2.96	-0.38	7	-0.19	7
AG	-2.14	5	0.62	-3.43	-1.52	5	-0.89	5
TCSE	-7.97	1	2.96	-2.69	-5.01	1	-2.05	3
TACP	-7.90	2	2.90	-2.73	-5.00	2	-2.11	2
TAI	-3.66	4	0.90	-4.06	-2.76	4	-1.86	4
XTM	-0.58	6	0.20	-2.96	-0.39	6	-0.19	6
XPSOCT	-0.58	8	0.20	-2.95	-0.38	8	-0.19	8
XIS	-4.82	3	0.82	-5.90	-4.00	3	-3.18	1

Trade-off between M (imports) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

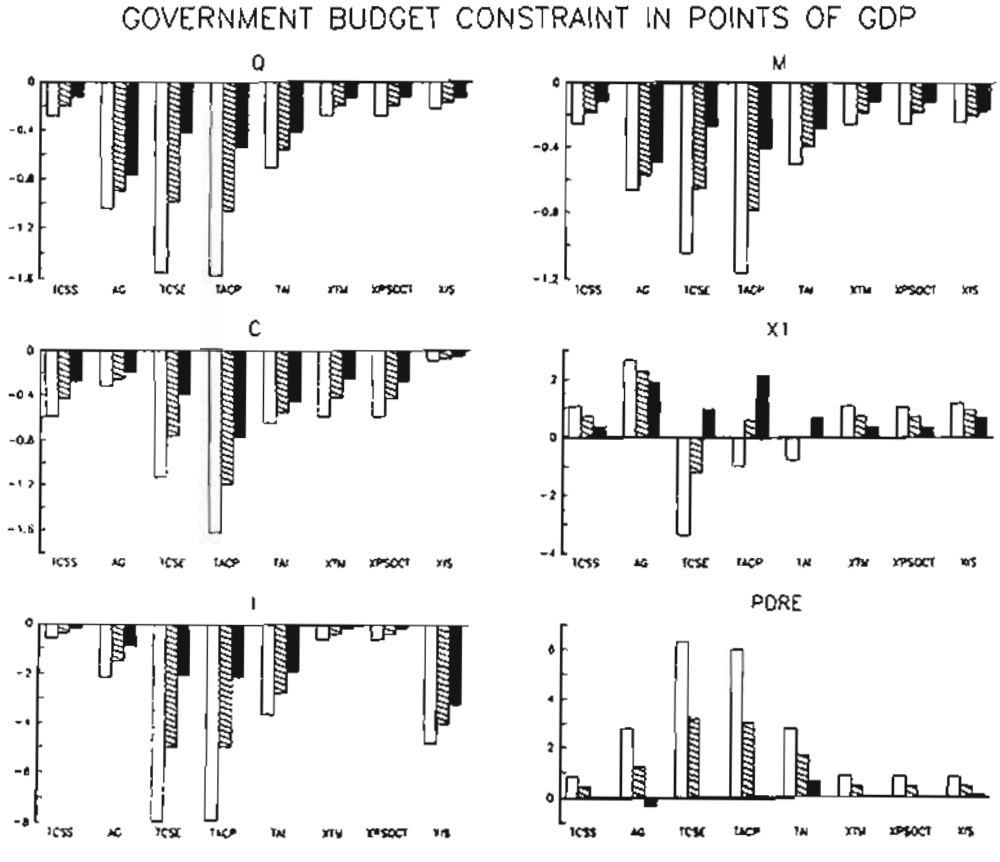
	Trade -off	Rank order	Stand error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	-0.26	6	0.07	-3.60	-0.19	7	-0.12	7
AG	-0.67	3	0.09	-7.44	-0.58	3	-0.49	1
TCSE	-1.05	2	0.39	-2.70	-0.66	2	-0.27	4
TACP	-1.17	1	0.38	-3.08	-0.79	1	-0.41	2
TAI	-0.51	4	0.11	-4.66	-0.40	4	-0.29	3
XTM	-0.26	5	0.07	-3.60	-0.19	6	-0.12	6
XPSOCT	-0.26	7	0.07	-3.59	-0.19	8	-0.11	8
XIS	-0.25	8	0.04	-5.66	-0.21	5	-0.16	5

Trade-off between X1 (exports) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade -off	Rank order	Stand. error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	1.05	.	0.34	3.11	0.71	.	0.38	.
AG	2.65	.	0.37	7.20	2.28	.	1.91	.
TCSE	-3.36	.	2.15	-1.56	-1.21	.	0.94	.
TACP	-0.97	.	1.55	-0.62	0.59	.	2.14	.
TAI	-0.75	.	0.71	-1.06	-0.04	.	0.67	.
XTM	1.06	.	0.34	3.11	0.72	.	0.38	.
XPSOCT	1.05	.	0.34	3.11	0.71	.	0.37	.
XIS	1.18	.	0.24	4.83	0.93	.	0.69	.

Trade-off between PDRE (unempl.) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-3}$)

	Trade -off	Rank order	Stand error (a)	*t-ratio*	*Trade-off* *a	Rank order	*Trade-off* *2a	Rank order
TCSS	0.83	6	0.39	2.11	0.44	7	0.04	.
AG	2.76	3	1.50	1.80	1.23	4	-0.30	.
TCSE	6.33	1	3.16	2.00	3.17	1	0.01	.
TACP	5.98	2	2.97	2.02	3.02	2	0.05	.
TAI	2.75	4	1.07	2.58	1.68	3	0.62	.
XTM	0.84	5	0.40	2.11	0.44	6	0.04	.
XPSOCT	0.83	7	0.39	2.11	0.44	8	0.04	.
XIS	0.78	8	0.33	2.40	0.46	5	0.13	.



Trade-off between Q (added value) and CFG/PIB (government budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-0.28	6	0.08	-3.67	-0.21	6	-0.13	7
AG	-1.04	3	0.14	-7.38	-0.90	3	-0.75	1
TCSE	-1.56	2	0.57	-2.76	-0.99	2	-0.43	3
TACP	-1.58	1	0.52	-3.02	-1.06	1	-0.53	2
TAI	-0.71	4	0.15	-4.72	-0.56	4	-0.41	4
XTM	-0.28	5	0.08	-3.67	-0.21	5	-0.13	6
XPSOCT	-0.18	7	0.08	-3.66	-0.20	7	-0.13	8
XIS	-0.22	8	0.05	-4.86	-0.17	8	-0.13	5

Trade-off between Q1 (added value-industrial) and CFG/PIB (gov. budget in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-0.64	7	0.20	-3.13	-0.43	7	-0.23	7
AG	-1.76	4	0.50	-3.50	-1.26	4	-0.76	4
TCSE	-6.91	1	2.68	-2.58	-4.23	1	-1.56	1
TACP	-6.16	2	2.30	-2.67	-3.85	2	-1.55	2
TAI	-2.89	3	0.73	-3.97	-2.16	3	-1.44	3
XTM	-0.64	6	0.21	-3.12	-0.44	6	-0.23	6
XPSOCT	-0.64	8	0.20	-3.12	-0.43	8	-0.23	8
XIS	-0.76	5	0.20	-3.89	-0.56	5	-0.37	5

Trade-off between Q2 (added value-nonindust.) and CFG/PIB (gov. budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

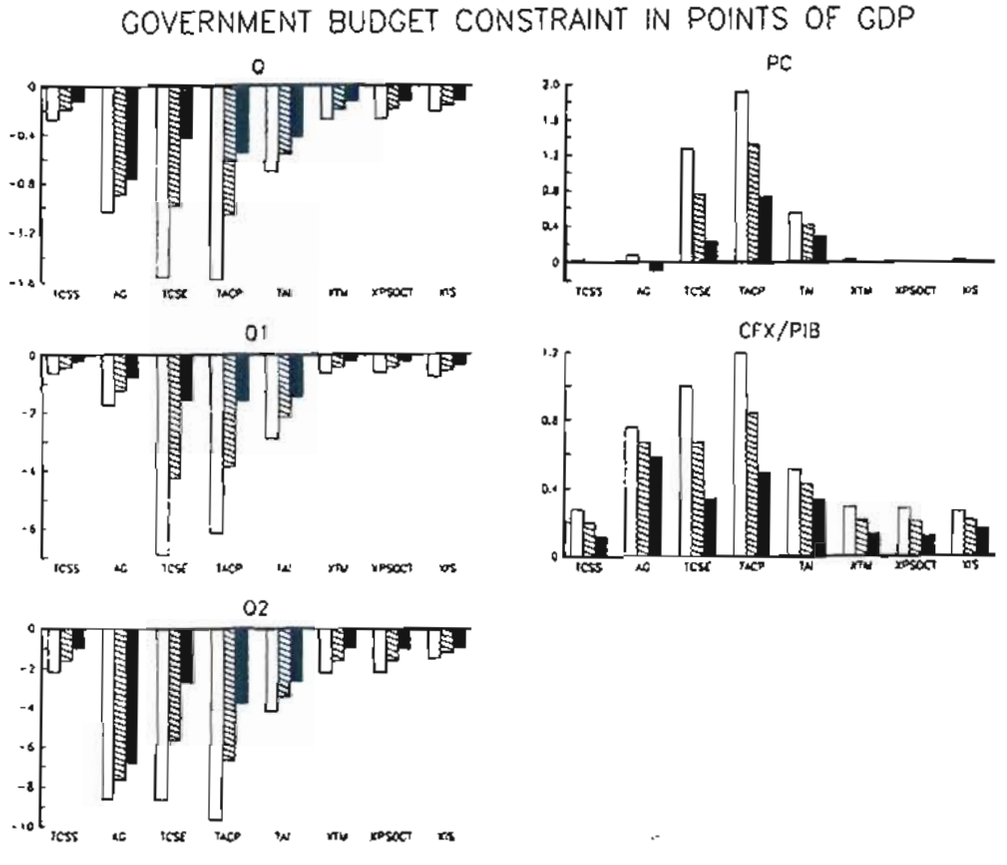
	Trade -off	Rank order	Stand. error (σ)	t-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-2.18	6	0.60	-3.61	-1.58	6	-0.97	6
AG	-8.63	3	0.94	-9.14	-7.69	1	-6.74	1
TCSE	-8.66	2	3.00	-2.89	-5.66	3	-2.66	3
TACP	-9.69	1	2.99	-3.23	-6.66	2	-3.68	2
TAI	-4.17	4	0.80	-5.25	-3.38	4	-2.58	4
XTM	-2.19	5	0.61	-3.61	-1.59	5	-0.98	5
XPSOCT	-2.18	7	0.60	-3.60	-1.57	7	-0.97	7
XIS	-1.44	8	0.27	-5.43	-1.18	8	-0.91	8

Trade-off between PC (consumption prices) and CFG/PIB (gov. budget measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-1}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	0.02	7	0.02	0.87	-0.00	.	-0.03	.
AG	0.07	4	0.08	0.89	-0.01	.	-0.09	.
TCSE	1.26	2	0.52	2.41	0.74	.	0.21	.
TACP	1.90	1	0.59	3.23	1.31	.	0.72	.
TAI	0.53	3	0.13	3.93	0.39	.	0.26	.
XTM	0.02	6	0.02	0.87	-0.00	.	-0.03	.
XPSOCT	0.02	8	0.02	0.87	-0.00	.	-0.03	.
XIS	0.02	5	0.02	0.93	-0.00	.	-0.02	.

Trade-off between CFX/PIB (trade balance) and CFG/PIB (gov. budget, both measured in points of GDP). Impact *trade-off* at 1981

	Trade -off	Rank order	Stand. error (σ)	t-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	0.28	6	0.08	3.64	0.21	7	0.13	7
AG	0.76	3	0.09	8.73	0.67	2	0.58	1
TCSE	1.00	2	0.33	3.00	0.67	3	0.34	3
TACP	1.19	1	0.35	3.39	0.84	1	0.49	2
TAI	0.51	4	0.09	5.60	0.42	4	0.33	4
XTM	0.29	5	0.08	3.64	0.21	6	0.13	6
XPSOCT	0.28	7	0.08	3.63	0.21	8	0.13	8
XIS	0.26	8	0.05	5.83	0.22	5	0.17	5



considered as a demand-side instrument). Concerning prices, supply-side instruments (with a large value) and demand-side ones (with a very small value) still associate a decrease in prices with government spending.

What is perhaps less expected is that the measure of uncertainty also gives quite similar results when either we consider the government budget constraint in absolute terms, or we measure it in points of GDP: the *t-ratios* do not change much, as the following table shows (for the added value Q).

Instrument	CFG	CFG/PIB	change
TCSS	-3.69	-3.67	-.02
AG	-7.49	-7.28	-.21
TCSE	-2.49	-2.76	+.27
TACP	-2.65	-3.02	+.37
TAI	-4.56	-4.72	+.16
XTM	-3.69	-3.67	-.02
XPSOCT	-3.68	-3.66	-.02
XIS	-5.00	-4.86	-.14

But this limited change is not similar for the different instrument: we can see in general that supply-side instruments (TCSE, TACP, TAI) increase their precision by something like 10%, while demand-side ones decrease by a much smaller amount. It could be expected of course that only the instruments working mostly through prices would see their precision increased by the reduction of the influence of price uncertainty.

In that light the conclusions of the previous section are not really changed: the *trade-offs* are almost always significant, the only exceptions being the effect of demand-side instruments on prices, and of supply-side ones on exports (the effect of price competitiveness working against that of tensions on domestic production capacity). And if we consider, as before, "*guaranteed trade-offs*" or *trade-offs* minus two standard errors (arguing that the decision maker might give as much value to the comparison between the guaranteed efficiency of different instruments than the average efficiency), we can still observe that although the gap

between supply- and demand-side instruments shortens in general, only AG closes it. In fact the only significant change is that now, due to its increased precision, the superiority of supply-side instruments is more evident. And this shows that the main conclusions of the previous section are practically insensitive to the use of a government budget measured in current francs, rather than in points of GDP.

5.3. Trade balance constraint (measured in points of GDP)

Although at first sight the constraint on trade balance looks similar in nature to that on government budget, there is a big difference concerning the economic interpretation of the *trade-off*: we can no longer clearly associate a result with a decision of spending, as the deciding agent (the State) and the spending (the country) are not the same. Now the spending is more a result than a reason of the modifying of economic equilibrium. And while in the first case the sign of the effect of the decision on the constrained variable was obvious due to the ex-ante part, it is no longer the case here, at least in theory, as the immediate effect itself is affected by uncertainty.

But if we consider the tables, we can see that most of the conclusions of the first test are not changed: the sign of the *trade-off* stays negative (we still have to spend in terms of trade balance to increase activity or any of its components) with the same exception of exports (an increase in internal demand decreases exports and trade balance). And the supply-side instruments (plus AG) appear globally more efficient than demand-side ones. But the hierarchy is now less clear, the range of values for Q (apart from the common scaling factor given by a power of 10) going now from *-1.55* to *-0.89* as compared to *(-1.58, -0.22)*: the

Trade-off between Q (added value) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.99	7	0.10	-10.14	-0.90	7	-0.80	7
AG	-1.37	3	0.07	-19.60	-1.30	2	-1.23	1
TCSE	-1.55	1	0.22	-6.93	-1.33	1	-1.10	2
TACP	-1.33	4	0.16	-8.40	-1.17	4	-1.01	4
TAI	-1.38	2	0.17	-7.91	-1.20	3	-1.03	3
XTM	-0.99	6	0.10	-10.14	-0.90	6	-0.80	6
XPSOCT	-0.99	5	0.10	-10.14	-0.90	5	-0.80	5
XIS	-0.84	8	0.07	-11.23	-0.76	8	-0.69	8

Trade-off between C (consumption) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.08	3	0.10	-21.38	-1.98	3	-1.88	3
AG	-0.42	7	0.07	-5.89	-0.35	7	-0.27	7
TCSE	-1.13	6	0.17	-6.77	-0.96	6	-0.80	6
TACP	-1.36	4	0.14	-9.59	-1.21	4	-1.07	4
TAI	-1.27	5	0.14	-8.95	-1.13	5	-0.98	5
XTM	-2.08	2	0.10	-21.38	-1.98	2	-1.88	2
XPSOCT	-2.08	1	0.10	-21.39	-1.98	1	-1.88	1
XIS	-0.32	8	0.05	-5.93	-0.27	8	-0.21	8

Trade off between I (investment) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.20	8	0.05	-4.39	-0.16	8	-0.11	8
AG	-0.28	5	0.06	-5.08	-0.23	5	-0.17	5
TCSE	-0.79	2	0.13	-6.19	-0.67	2	-0.54	2
TACP	-0.66	4	0.10	-6.58	-0.56	4	-0.46	4
TAI	-0.71	3	0.10	-7.28	-0.62	3	-0.52	3
XTM	-0.20	7	0.05	-4.39	-0.16	7	-0.11	7
XPSOCT	-0.20	6	0.05	-4.40	-0.16	6	-0.11	6
XIS	-1.83	1	0.07	-25.90	-1.76	1	-1.69	1

Trade-off between M (imports) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

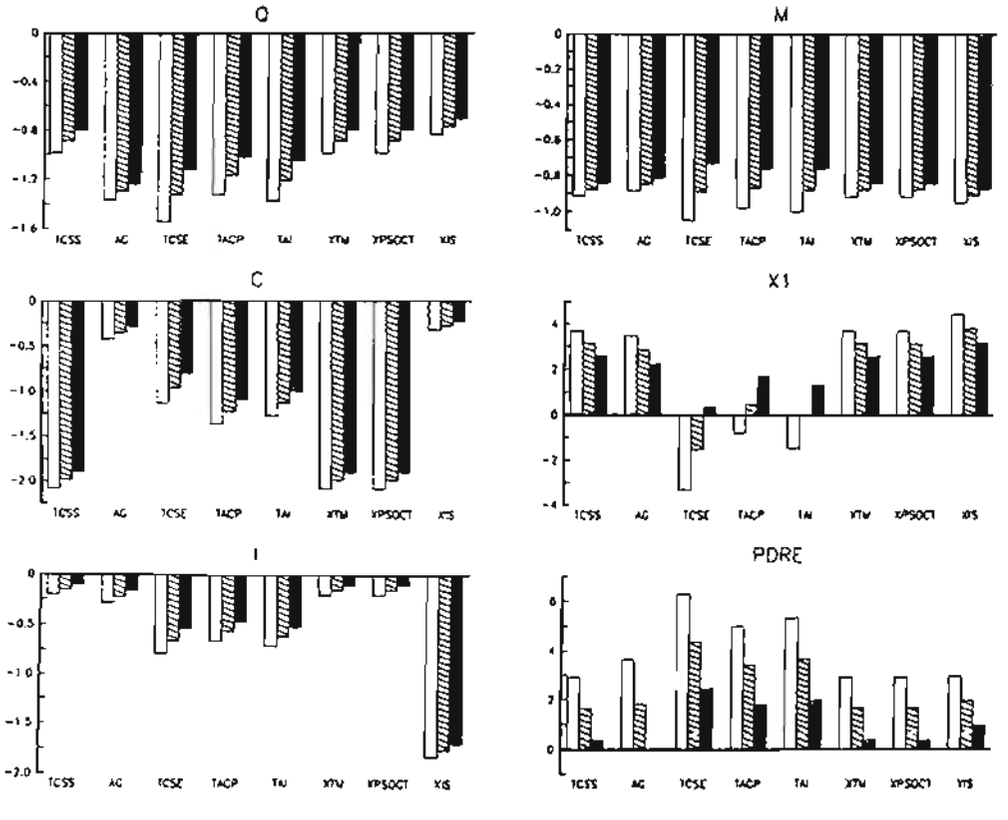
	Trade -off	Rank order	Stand error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.92	7	0.04	-24.12	-0.88	5	-0.84	4
AG	-0.89	8	0.04	-23.81	-0.85	8	-0.82	5
TCSE	-1.05	1	0.16	-6.35	-0.88	2	-0.72	8
TACP	-0.98	3	0.11	-8.97	-0.87	6	-0.76	6
TAI	-1.00	2	0.12	-7.99	-0.87	7	-0.75	7
XTM	-0.92	6	0.04	-24.12	-0.88	4	-0.84	3
XPSOCT	-0.92	5	0.04	-24.12	-0.88	3	-0.84	2
XIS	-0.95	4	0.04	-21.29	-0.91	1	-0.86	1

Trade-off between X1 (exports) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade -off	Rank order	Stand error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	3.71	.	0.56	6.68	3.16	.	2.60	.
AG	3.50	.	0.64	5.49	2.86	.	2.22	.
TCSE	-3.34	.	1.83	-1.83	-1.51	.	0.31	.
TACP	-0.81	.	1.25	-0.65	0.43	.	1.68	.
TAI	-1.47	.	1.38	-1.07	-0.09	.	1.29	.
XTM	3.71	.	0.56	6.68	3.16	.	2.60	.
XPSOCT	3.71	.	0.56	6.69	3.16	.	2.60	.
XIS	4.47	.	0.63	7.14	3.85	.	3.22	.

Trade-off between PDRE (unemployment) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-3}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	2.93	8	1.27	2.30	1.65	8	0.38	.
AG	3.64	4	1.83	1.98	1.80	5	-0.03	.
TCSE	6.30	1	1.93	3.26	4.36	1	2.43	.
TACP	5.02	3	1.61	3.11	3.41	3	1.79	.
TAI	5.35	2	1.69	3.17	3.67	2	1.98	.
XTM	2.93	7	1.27	2.30	1.65	7	0.38	.
XPSOCT	2.93	6	1.27	2.30	1.65	6	0.38	.
XIS	2.97	5	1.01	2.94	1.96	4	0.93	.



Trade-off between Q (added value) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ·σ	Rank order	*Trade-off* ·2σ	Rank order
TCSS	-0.99	7	0.10	-10.14	-0.90	7	-0.80	7
AG	-1.37	3	0.07	-19.60	-1.30	2	-1.23	1
TCSE	-1.55	1	0.22	-6.83	-1.33	1	-1.10	2
TACP	-1.33	4	0.16	-8.40	-1.17	4	-1.01	4
TAI	-1.38	2	0.17	-7.91	-1.20	3	-1.03	3
XTM	-0.99	6	0.10	-10.14	-0.90	6	-0.80	6
XPSOCT	-0.99	5	0.10	-10.14	-0.90	5	-0.80	5
XIS	-0.84	8	0.07	-11.73	-0.76	8	-0.69	8

Trade-off between Q1 (added value-industrial) and CFX/PIB (trade bal. measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-5}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ·σ	Rank order	*Trade-off* ·2σ	Rank order
TCSS	-2.25	8	0.40	-5.58	-1.85	8	-1.45	7
AG	-2.33	5	0.45	-5.18	-1.88	5	-1.43	6
TCSE	-6.88	1	1.16	-5.92	-5.72	1	-4.55	1
TACP	-5.17	3	0.81	-6.34	-4.35	3	-3.54	3
TAI	-5.64	2	0.90	-6.27	-4.74	2	-3.84	2
XTM	-2.25	7	0.40	-5.58	-1.85	7	-1.45	6
XPSOCT	-2.25	6	0.40	-5.58	-1.85	6	-1.45	5
XIS	-2.88	4	0.43	-6.67	-2.45	4	-2.02	4

Trade-off between Q2 (added value-nonindust.) and CFX/PIB (trade bal. measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-6}$)

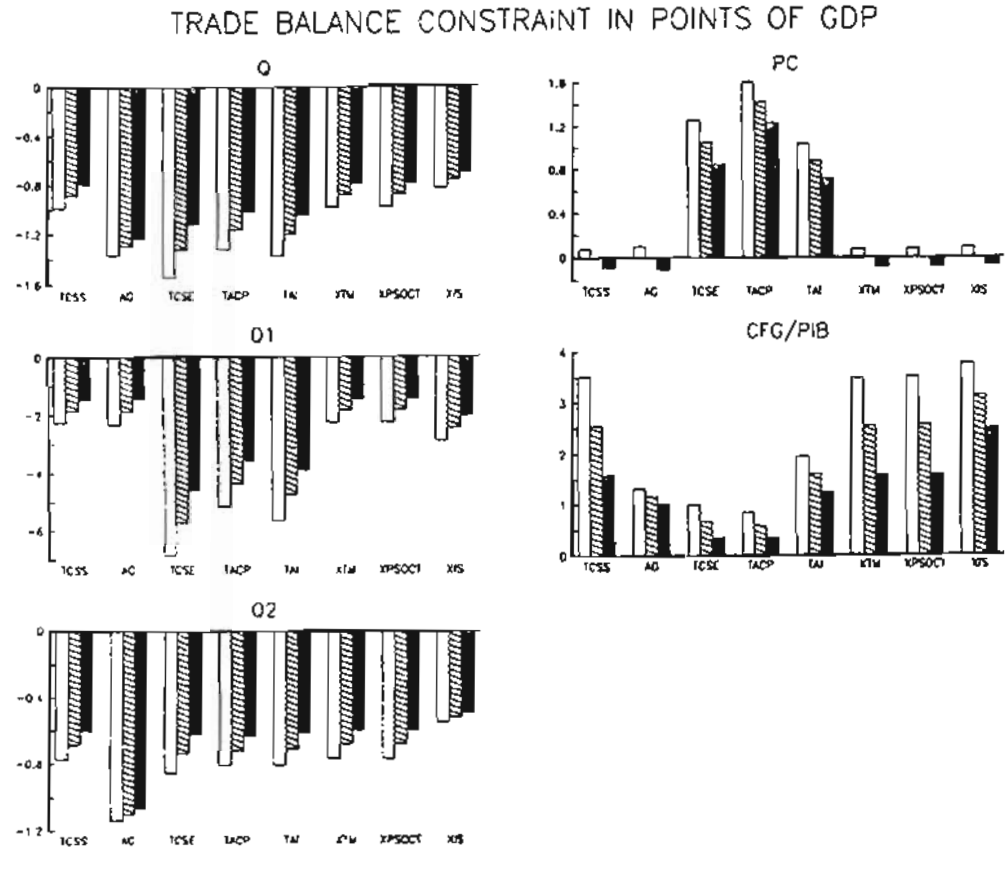
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ·σ	Rank order	*Trade-off* ·2σ	Rank order
TCSS	-0.77	7	0.09	-8.53	-0.68	7	-0.59	7
AG	-3.14	1	0.04	-26.24	-1.10	1	-1.05	1
TCSE	-0.86	2	0.12	-7.45	-0.75	2	-0.63	2
TACP	-0.81	4	0.09	-8.76	-0.72	4	-0.63	3
TAI	-0.81	3	0.10	-8.49	-0.72	3	-0.62	4
XTM	-0.77	6	0.09	-8.53	-0.68	6	-0.59	6
XPSOCT	-0.77	5	0.09	-8.53	-0.68	5	-0.59	5
XIS	-0.55	8	0.03	-17.31	-0.52	8	-0.48	8

Trade-off between PC (consumption prices) and CFX/PIB (trade balance measured in points of GDP). Impact *trade-off* at 1981 ($\times 10^{-1}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ·σ	Rank order	*Trade-off* ·2σ	Rank order
TCSS	0.07	8	0.08	0.88	-0.01		-0.09	
AG	0.09	4	0.10	0.96	-0.00		-0.10	
TCSE	1.25	2	0.21	5.84	1.04		0.82	
TACP	1.60	1	0.19	8.57	1.41		1.22	
TAI	1.03	3	0.16	6.36	0.87		0.71	
XTM	0.07	7	0.08	0.88	-0.01		-0.09	
XPSOCT	0.07	6	0.08	0.88	-0.01		-0.09	
XIS	0.08	5	0.08	0.99	-0.00		-0.09	

Trade-off between CFG/PIB (gov. budget) and CFX/PIB (trade balance, both measured in points of GDP). Impact *trade-off* at 1981

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ·σ	Rank order	*Trade-off* ·2σ	Rank order
TCSS	3.53	3	0.97	3.64	2.56	3	1.59	2
AG	1.32	6	0.15	8.73	1.17	6	1.02	6
TCSE	1.00	7	0.33	3.00	0.66	7	0.33	8
TACP	0.84	8	0.25	3.39	0.59	8	0.34	7
TAI	1.95	5	0.35	5.60	1.60	5	1.25	5
XTM	3.50	4	0.96	3.64	2.54	4	1.58	4
XPSOCT	3.53	2	0.97	3.63	2.56	2	1.59	3
XIS	3.79	1	0.65	5.83	3.14	1	2.49	1



efficiency of demand-side instruments is now greater. In fact, the main differences appear when we consider uncertainty.

- In all cases but one (the export *trade-off* using AG as instrument) the precision is increased, sometimes by a very wide margin, in particular for Q itself, where the range of the *t-ratios* changes from *(-2.76,-7.28)* to *(-6.93,-19.60)* with the same extreme instruments. Indeed, for demand and most of its components, the relative precision of supply-side instruments is still the lowest, with the only exception of investment (which have a more precise link with subsequent imports than with the government spending on supply-side instruments). On the whole, the link of most variables with the resulting trade balance seems more precise than with government budget, even though a large part of the last statistic is determined ex-ante. This could be expected, as we are comparing:
  (1) a very precise influence of demand on the trade balance (through imports and tensions on domestic productive capacity);
  (2) a less precise influence of government decisions on demand through the revenue of the agents, which in the case of households is affected by the high marginal savings ratio, and for firms by the high uncertainty of the investment equation; moreover, the influence of the decisions on government budget is itself uncertain.
- The precision of the price *trade-off* is greatly increased for supply-side instruments, which implies that the guaranteed value stays high, while demand-side instruments keep the same (low) precision. This can be explained by the direct relation between prices and the elements of external trade, through price competitiveness and the terms of trade.
- The precision is now comparatively much greater for the non-industrial part of Q (less exposed to international competition).

- The high precision of demand instruments on both imports and trade balance, and the correlation of these influences give the related *trade-offs* a high precision (*t* statistics greater than 20) thus put them in the first places if we consider guaranteed values; anyway all the precisions are high and the differences small.
- The uncertainty on unemployment stays comparatively high, as it is mostly determined by the less precisely affected industrial activity.

5.4. Unemployment constraint

For this new experiment, the *trade-off* values get a different meaning, as unemployment has not the nature of a resource we can spend to improve some objective; now the meaning of the statistic is more symmetrical, such as "*if we have two objectives, how much must we lose on one if we want to make a unitary gain on the other?*". But if we consider the list of variables we have used so far as numerator, we can see that most of them improve with an improvement of the target; we can then no longer speak of *trade-offs*, and what we get is "*if we have two objectives, how much must do we gain on one when we make a unitary gain on the other?*". This is of course less interesting, as once its sign is determined, the use of this statistic to choose between two instruments, or to define relative levels of use for each of them, is no longer needed: the obvious decision is to use this instrument in the way in which it improves the two targets. Similarly, the uncertainty of the *trade-offs* should be used to compare them not to each other, but to the zero value.

Let us now consider the tables, and let us look for the cases in which real *trade-offs* appear. We see that there are only two cases of real

trade-offs.[4] The first is on exports, considering only the demand-side instruments: a decrease of unemployment through an increase of internal demand affects unfavorably exports, as could be expected. The second is on imports, which show an increase in all cases as a result of an improvement of domestic activity and employment.

As to the uncertainty, the stability of the sign of the *trade-off*, thus of the link between the influences of the instrument both on unemployment and on another variable, appears significant in almost all cases; the only exceptions concern prices (for demand-side instruments) and government demand which, composed mostly of non-industrial product, affects a sector in which an increase in employment draws mostly on the non-active population. But the precision is never very high, the *t*-statistics being restricted to a range going from 2 to 4, with the supply-side instruments showing in general a better value, probably because they work mostly through the price competitiveness of the industrial sector, in which activity has a stronger influence on unemployment.

[4] except of course for the *trade-offs* with trade and government balances, which have almost exactly the same numerical properties as the already studied inverse (inverse *trade-off*, same *t*-statistic).

Trade-off between Q (added value) and PDRE (unemployment).
Impact *trade-off* at 1981 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-3.40	4	1.47	-2.31	-1.93	2	-0.46	
AG	-3.77	1	1.91	-1.98	-1.87	6	0.04	
TCSE	-2.46	8	0.64	-3.87	-1.82	8	-1.19	.
TACP	-2.64	6	0.77	-3.45	-1.88	5	-1.11	.
TAI	-2.57	7	0.71	-3.60	-1.86	7	-1.14	.
XTM	-3.40	3	1.47	-2.31	-1.93	3	-0.46	.
XPSOCT	-3.40	2	1.47	-2.31	-1.93	1	-0.46	.
XIS	-2.81	5	0.89	-3.15	-1.92	4	-1.03	.

Trade-off between C (consumption) and PDRE (unemployment).
Impact *trade-off* at 1981 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-7.10	1	3.12	-2.28	-3.98	2	-0.86	.
AG	-1.14	7	0.57	-1.99	-0.57	8	0.01	.
TCSE	-1.79	6	0.56	-3.20	-1.23	6	-0.67	.
TACP	-2.70	4	0.90	-2.99	-1.80	4	-0.90	.
TAI	-2.37	5	0.77	-3.08	-1.60	5	-0.83	.
XTM	-7.10	2	3.12	-2.28	-3.98	3	-0.86	.
XPSOCT	-7.10	3	3.12	-2.28	-3.98	1	-0.86	.
XIS	-1.09	8	0.42	-2.61	-0.67	7	-0.26	.

Trade-off between I (investment) and PDRE (unemployment).
Impact *trade-off* at 1981 ($\times 10^{-2}$)

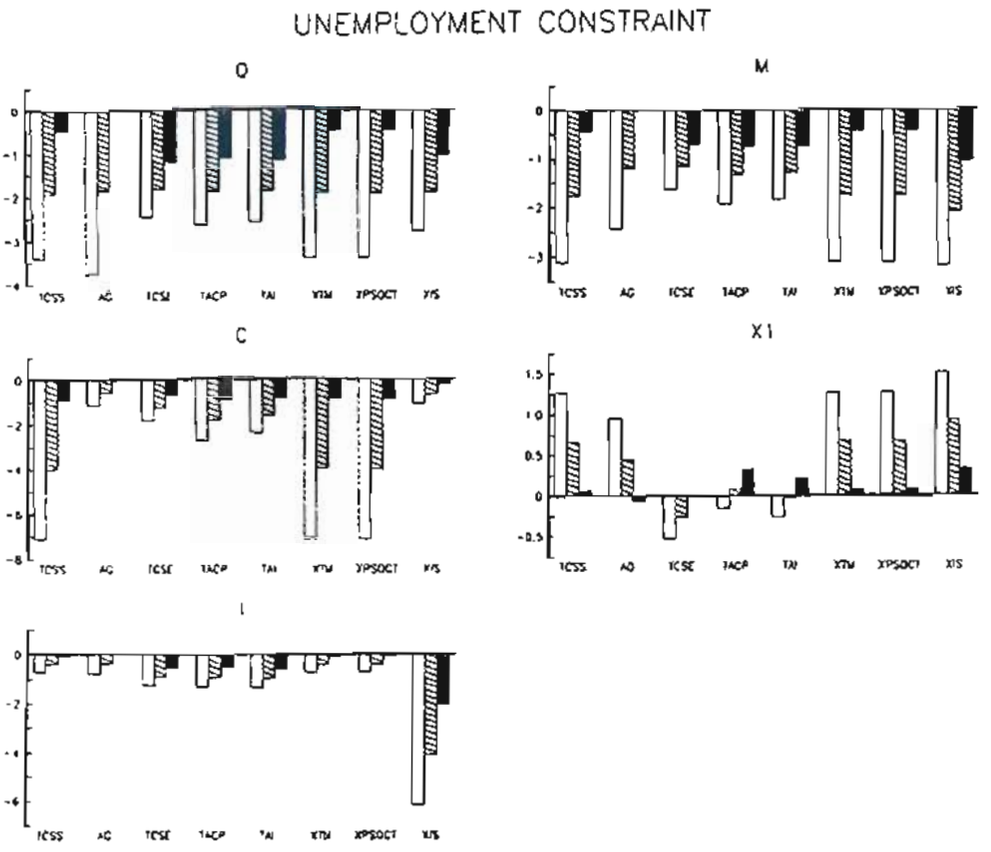
	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.70	8	0.32	-2.15	-0.37	7	-0.05	.
AG	-0.78	5	0.42	-1.86	-0.36	8	0.06	.
TCSE	-1.26	4	0.37	-3.36	-0.89	4	-0.51	.
TACP	-1.32	3	0.41	-3.20	-0.91	3	-0.49	.
TAI	-1.33	2	0.39	-3.38	-0.94	2	-0.54	.
XTM	-0.70	7	0.32	-2.15	-0.37	6	-0.05	.
XPSOCT	-0.70	6	0.32	-2.15	-0.37	5	-0.05	.
XIS	-6.15	1	2.08	-2.95	-4.07	1	-1.98	.

Trade-off between M (imports) and PDRE (unemployment)
Impact *trade-off* at 1981 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-3.13	4	1.35	-2.32	-1.78	4	-0.43	.
AG	-2.45	5	1.23	-1.99	-1.22	7	0.01	
TCSE	-1.66	8	0.48	-3.48	-1.18	8	-0.71	
TACP	-1.96	6	0.60	-3.27	-1.36	5	-0.76	.
TAI	-1.86	7	0.55	-3.36	-1.31	6	-0.75	.
XTM	-3.13	3	1.35	-2.32	-1.78	3	-0.43	.
XPSOCT	-3.13	2	1.35	-2.32	-1.78	2	-0.43	.
XIS	-3.20	1	1.07	-2.99	-2.13	1	-1.06	.

Trade-off between X1 (exports) and PDRE (unemployment).
Impact *trade-off* at 1981 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	1.27	.	0.60	2.12	0.67	.	0.07	
AG	0.96	.	0.51	1.87	0.45	.	-0.07	
TCSE	-0.53	.	0.27	-1.96	-0.26		0.01	.
TACP	-0.16	.	0.24	-0.68	0.07	.	0.31	
TAI	-0.27	.	0.24	-1.14	-0.03	.	0.21	
XTM	1.27	.	0.60	2.12	0.67	.	0.07	
XPSOCT	1.27	.	0.60	2.12	0.67	.	0.07	.
XIS	1.51	.	0.59	2.53	0.91	.	0.32	.



Trade-off between Q (added value) and PDRE (unemployment). Impact *trade-off* at 1981 ($\cdot 10^{-2}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-3.40	4	1.47	-2.31	-1.93	2	-0.46	.
AG	-3.22	1	1.91	-1.69	-1.87	6	0.04	.
TCSE	-3.46	8	0.64	-3.87	-1.82	8	-3.19	.
TACP	-2.64	6	0.77	-3.45	-1.88	5	-1.11	.
TAI	-2.57	7	0.71	-3.60	-1.86	7	-1.14	.
XTM	-3.40	3	1.47	-2.31	-1.93	3	-0.46	.
XPSOCT	-3.40	2	1.47	-2.31	-1.93	1	-0.46	.
XIS	-2.81	5	0.89	-3.15	-1.92	4	-1.03	.

Trade-off between Q1 (added value-industrial) and PDRE (unempl.). Impact *trade-off* at 1981 ($\cdot 10^{-2}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-0.77	6	0.34	-2.28	-0.43	6	-0.09	.
AG	-0.64	8	0.34	-1.90	-0.30	8	0.04	.
TCSE	-1.09	1	0.27	-3.98	-0.82	1	-0.54	.
TACP	-1.03	3	0.29	-3.56	-0.74	3	-0.45	.
TAI	-1.05	2	0.28	-3.73	-0.77	2	-0.49	.
XTM	-0.77	5	0.34	-2.28	-0.43	5	-0.09	.
XPSOCT	-0.77	7	0.34	-2.28	-0.43	7	-0.09	.
XIS	-0.97	4	0.30	-3.20	-0.67	4	-0.36	.

Trade-off between Q2 (added value-nonindust.) and PDRE (unempl.). Impact *trade-off* at 1981 ($\cdot 10^{-2}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	-2.82	4	1.16	-2.28	-1.46	4	-0.30	.
AG	-3.13	1	1.59	-1.97	-1.55	1	0.04	.
TCSE	-1.37	8	0.37	-3.80	-1.00	8	-0.63	.
TACP	-1.61	6	0.49	-3.27	-1.12	6	-0.63	.
TAI	-1.52	7	0.44	-3.43	-1.08	7	-0.63	.
XTM	-2.82	3	1.16	-2.26	-1.46	3	-0.30	.
XPSOCT	-2.63	2	1.16	-2.26	-1.46	2	-0.30	.
XIS	-1.84	5	0.60	-3.06	-1.24	5	-0.64	.

Trade-off between PC (consumption prices) and PDRE (unemployment). Impact *trade-off* at 1981 ($\cdot 10^{3}$)

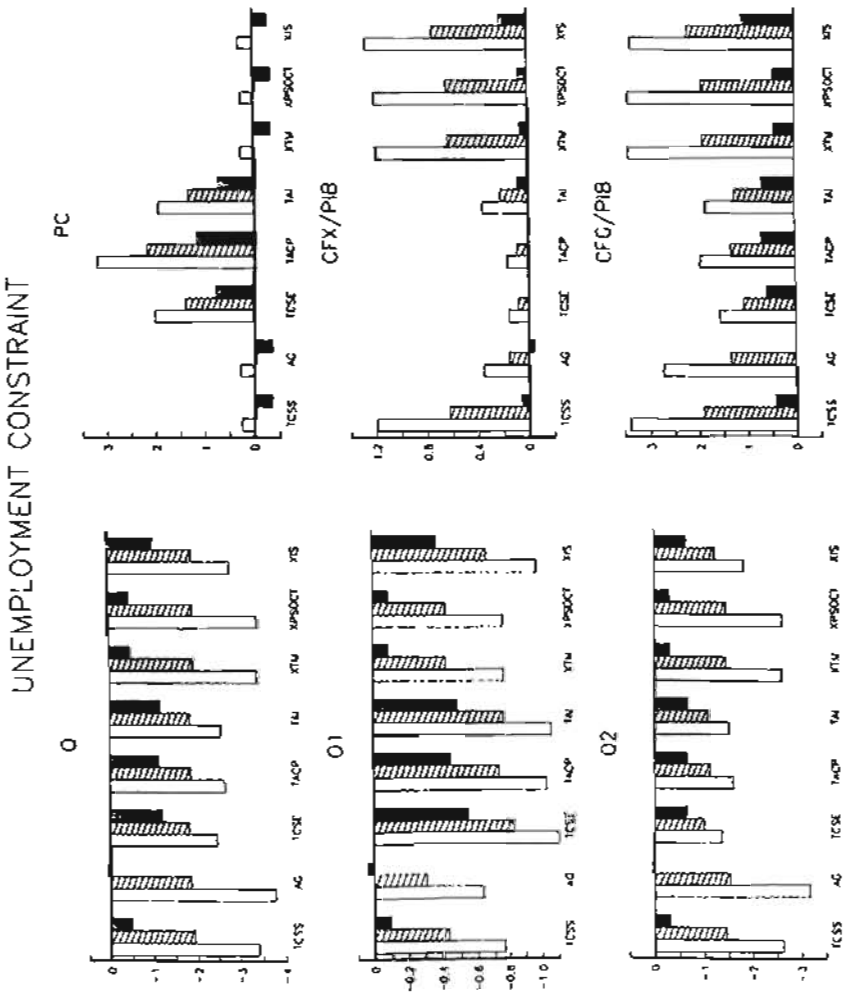
	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade off -2σ*	Rank order
TCSS	0.24	8	0.29	0.84	-0.05	.	-0.33	.
AG	0.29	5	0.33	0.85	-0.05	.	-0.35	.
TCSE	1.99	2	0.62	3.19	1.37	.	0.74	.
TACP	3.78	1	1.02	3.72	2.16	.	1.14	.
TAI	1.82	3	0.61	3.16	1.31	.	0.71	.
XTM	0.24	7	0.29	0.84	-0.05	.	-0.33	.
XPSOCT	0.24	6	0.29	0.84	-0.05	.	-0.33	.
XIS	0.28	4	0.28	1.00	-0.00	.	-0.28	.

Trade-off between CFG/PIB (gov. budget in points of GDP) and PDRE (unemployment). Impact *trade-off* at 1981 ($\cdot 10^{3}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	1.20	3	0.57	2.11	0.63	3	0.06	.
AG	0.36	6	0.20	1.80	0.16	6	-0.04	.
TCSE	0.16	8	0.08	2.00	0.08	8	0.00	.
TACP	0.17	7	0.08	2.02	0.08	7	0.00	.
TAI	0.36	5	0.14	2.56	0.22	5	0.08	.
XTM	1.20	4	0.57	2.11	0.63	4	0.06	.
XPSOCT	1.21	2	0.57	2.11	0.63	2	0.06	.
XIS	1.28	1	0.53	2.40	0.74	1	0.21	.

Trade-off between CFX/PIB (trade bal. in points of GDP) and PDRE (unemployment). Impact *trade-off* at 1981 ($\cdot 10^{3}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	3.42	1	1.49	2.30	1.93	2	0.44	.
AG	2.75	5	1.38	1.98	1.36	5	-0.02	.
TCSE	1.59	8	0.48	3.26	1.10	8	0.61	.
TACP	1.89	6	0.64	2.93	1.25	6	0.71	.
TAI	1.87	7	0.59	3.17	1.28	7	0.69	.
XTM	3.42	2	1.49	2.30	1.93	3	0.44	.
XPSOCT	3.42	3	1.49	2.30	1.93	4	0.44	.
XIS	3.37	4	1.14	2.94	2.22	1	1.08	.



5.5. *Inflation constraint*

The same observation can be made here as for the previous case: the statistics will be interesting when inflation must increase to improve the other variable. However this case should be the exception, as we have seen that, in the one-period case, an increase in global activity and most of its elements was associated with a decrease in inflation. And as demand instruments have a very limited influence on prices, the actual value of their *trade-offs* is very high compared to supply-side ones. It is only, as always, for the influence on imports and on exports using demand-side instruments that improving inflation shows a negative effect.

Considering uncertainty, the whole set of tables shows also a clear distinction between demand and supply instruments: the former have so high an uncertainty that their large *trade-offs* are not at all significant, while for the latter the value, though small, is quite reliable. Of course this is explained by the direct influence of these instruments on prices, compared with the small deflationary effect of demand-side instruments resulting from the contrary influences of the productivity cycle and of tensions.

Trade-off between Q (added value) and ΔPC (inflation rate).
Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	-1.44	2	3.81	-0.90	0.32	.	4.18	.
AG	-3.53	1	3.57	-0.99	0.04	.	3.61	.
TCSE	-0.30	7	0.05	-6.49	-0.26	.	-0.21	.
TACP	-0.20	8	0.02	-9.25	-0.18	.	-0.16	.
TAI	-0.33	6	0.04	-7.53	-0.28	.	-0.24	.
XTM	-3.44	3	3.81	-0.90	0.37	.	4.18	.
XPSOCT	-3.44	4	3.80	-0.91	0.36	.	4.15	.
XIS	-2.46	5	2.37	-1.04	-0.09	.	2.28	.

Trade-off between C (consumption) and ΔPC (inflation rate).
Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	-7.20	1	8.38	-0.86	1.18	.	9.57	.
AG	-1.07	4	1.21	-0.88	0.14	.	1.36	.
TCSE	-0.22	7	0.04	-5.03	-0.18	.	-0.13	.
TACP	-0.21	8	0.03	-6.87	-0.18	.	-0.15	.
TAI	-0.30	6	0.06	-5.26	-0.24	.	-0.19	.
XTM	-7.20	2	8.38	-0.86	1.18	.	9.56	.
XPSOCT	-7.19	3	8.35	-0.86	1.16	.	9.51	.
XIS	-0.95	5	1.04	-0.92	0.09	.	1.13	.

Trade-off between I (investment) and ΔPC (inflation rate)
Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	-0.71	3	0.68	-1.04	-0.02	.	0.66	.
AG	-0.73	2	0.65	-1.12	-0.08	.	0.57	.
TCSE	-0.15	7	0.03	-4.86	-0.12	.	-0.09	.
TACP	-0.10	8	0.02	-6.40	-0.09	.	-0.07	.
TAI	-0.17	6	0.03	-6.62	-0.14	.	-0.12	.
XTM	-0.71	4	0.68	-1.04	-0.02	.	0.66	.
XPSOCT	-0.71	5	0.68	-1.04	-0.03	.	0.66	.
XIS	-5.37	1	5.45	-0.99	0.08	.	5.53	.

Trade-off between M (imports) and ΔPC (inflation rate).
Impact *trade-off* at 1981 ($\times 10^{-4}$)

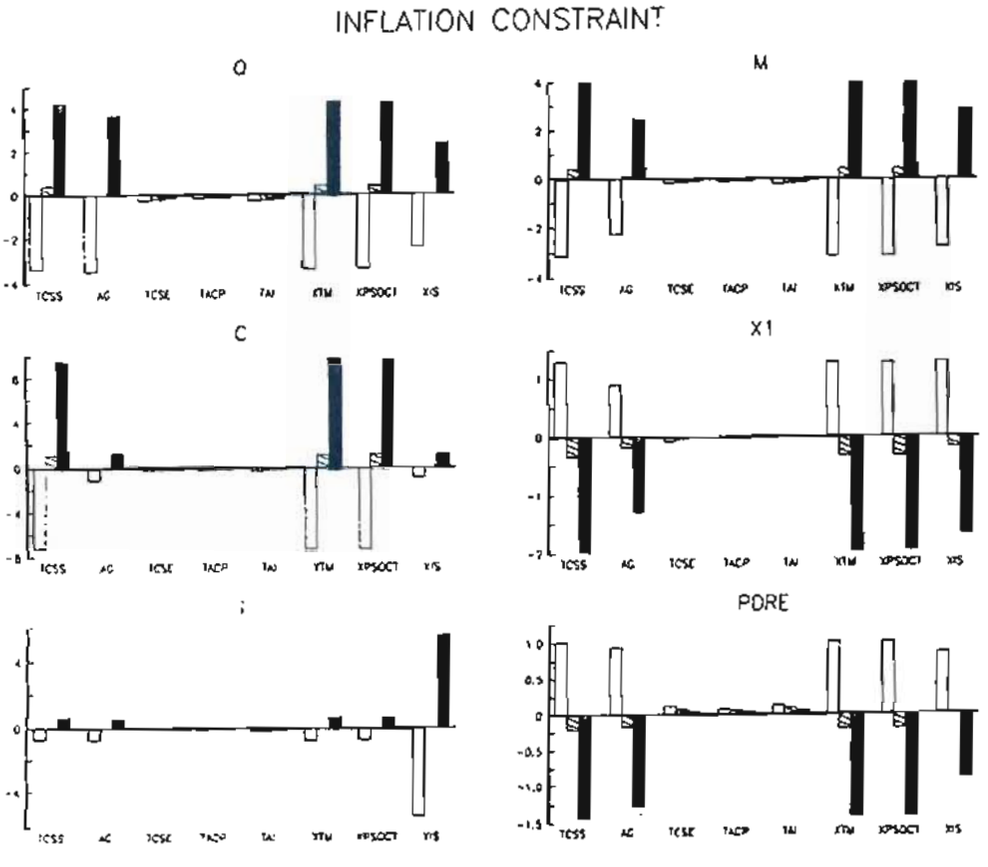
	Trade -off	Rank order	Stand. error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	-3.17	1	3.55	-0.89	0.38	.	3.93	.
AG	-2.29	5	2.35	-0.98	0.05	.	2.40	.
TCSE	-0.29	7	0.04	-5.32	-0.17	.	-0.13	.
TACP	-0.15	8	0.02	-7.67	-0.13	.	-0.11	.
TAI	-0.24	6	0.04	-6.19	-0.20	.	-0.16	.
XTM	-3.17	2	3.55	-0.89	0.38	.	3.93	.
XPSOCT	-3.17	3	3.54	-0.90	0.37	.	3.91	.
XIS	-2.80	4	2.80	-1.00	0.01	.	2.81	.

Trade-off between X1 (exports) and ΔPC (inflation rate)
Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade -off	Rank order	Stand error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	1.29	.	1.62	0.80	-0.33	.	-1.95	.
AG	0.90	.	1.08	0.83	-0.18	.	-1.26	.
TCSE	-0.07	.	0.03	-2.13	-0.03	.	-0.00	.
TACP	-0.01	.	0.02	-0.68	0.01	.	0.02	.
TAI	-0.03	.	0.03	-1.18	-0.01	.	0.02	.
XTM	1.29	.	1.62	0.80	-0.33	.	-1.95	.
XPSOCT	1.28	.	1.61	0.80	-0.33	.	-1.94	.
XIS	1.31	.	1.49	0.88	-0.18	.	-1.67	.

Trade-off between PDRE (unemployment) and ΔPC (inflation rate)
Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade -off	Rank order	Stand. error (σ)	t-ratio	Trade-off ±σ	Rank order	Trade-off ±2σ	Rank order
TCSS	1.01	1	1.21	0.84	-0.20	.	-1.41	.
AG	0.94	4	1.10	0.85	-0.17	.	-1.27	.
TCSE	0.12	7	0.04	3.19	0.08	.	0.05	.
TACP	0.08	8	0.02	3.12	0.05	.	0.03	.
TAI	0.13	6	0.04	3.16	0.09	.	0.05	.
XTM	1.01	2	1.21	0.84	-0.20	.	-1.41	.
XPSOCT	1.01	3	1.21	0.84	-0.20	.	-1.40	.
XIS	0.87	5	0.88	0.99	-0.00	.	-0.88	.



Trade-off between Q (added value) and ΔPC (inflation rate). Impact *trade-off* at 1981 ($\times 10^{-4}$)

	Trade-off	Rank order	Stand. error (σ)	t-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	-3.44	2	3.81	-0.90	0.37	.	4.18	.
AG	-3.53	1	3.57	-0.99	0.04	.	3.61	
TCSE	-0.30	7	0.09	-6.49	-0.26		-0.21	
TACP	-0.30	8	0.02	-9.25	-0.18		-0.16	
TAI	-0.33	6	0.04	-7.53	-0.28		-0.74	
XTM	-3.44	3	3.81	-0.90	0.37	.	4.18	.
XPSOCT	-3.44	4	3.80	-0.91	0.36	.	4.15	.
XIS	-2.46	5	2.37	-1.04	-0.09	.	2.28	

Trade-off between Q1 (added value-industrial) and ΔPC (inflation rate) Impact *trade-off* at 1981 ($\times 10^{-3}$)

	Trade-off	Rank order	Stand. error (σ)	t-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	-7.81	2	7.82	-1.00	0.01	.	7.83	.
AG	-5.99	5	5.31	-1.13	-0.68	.	4.63	.
TCSE	-1.34	6	0.22	-6.02	-1.12	.	-0.89	
TACP	-0.79	8	0.11	-7.32	-0.68	.	-0.57	
TAI	-1.34	7	0.19	-6.92	-1.14	.	-0.95	
XTM	-7.81	3	7.82	-1.00	0.01	.	7.82	
XPSOCT	-7.80	4	7.79	-1.00	-0.01	.	7.77	
XIS	-8.47	1	7.75	-1.09	-0.72		7.03	.

Trade-off between Q2 (added value-nonindust.) and ΔPC (inflation rate) Impact *trade-off* at 1981 ($\times 10^{-4}$)

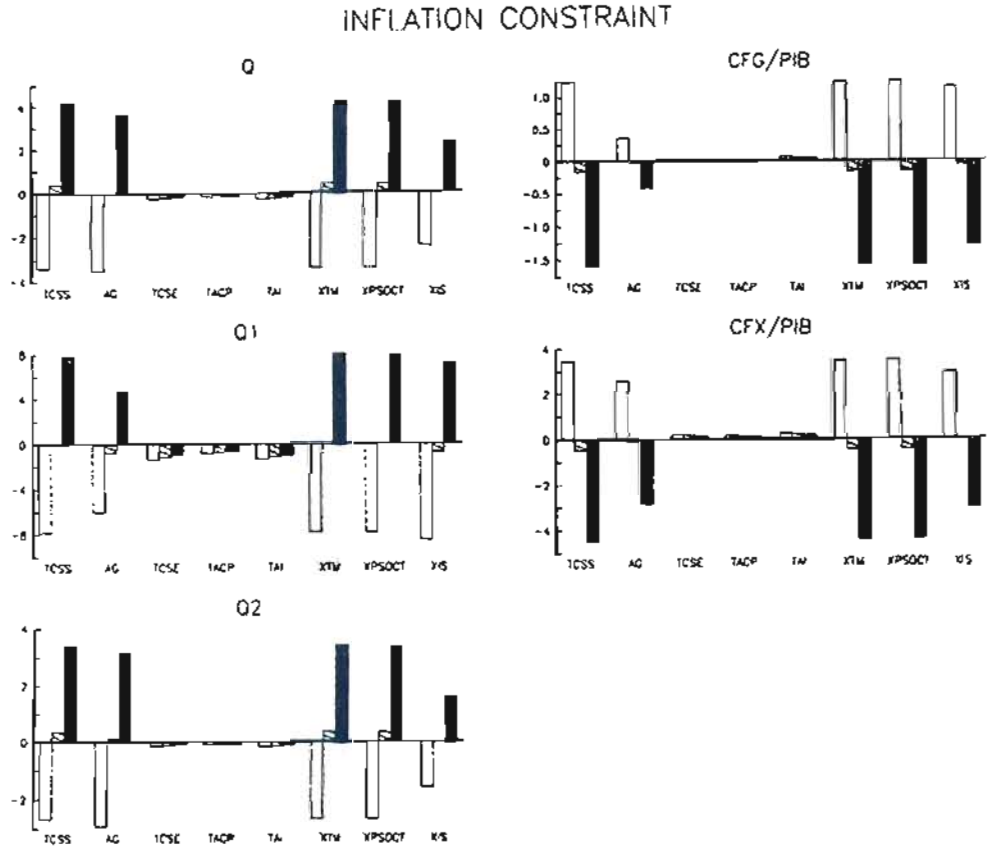
	Trade-off	Rank order	Stand. error (σ)	t-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	-2.66	2	3.04	-0.88	0.37	.	3.41	
AG	-2.93	1	3.05	-0.96	0.11	.	3.16	
TCSE	-0.17	7	0.03	-6.47	-0.14	.	-0.12	
TACP	-0.12	8	0.01	-8.79	-0.11	.	-0.10	
TAI	-0.19	6	0.03	-7.10	-0.17	.	-0.14	
XTM	-2.66	3	3.03	-0.88	0.37	.	3.41	
XPSOCT	-2.66	4	3.02	-0.88	0.37	.	3.39	
XIS	-1.61	5	1.69	-1.01	-0.01	.	1.58	

Trade-off between CFG/PIB (gov. budget in points of GDP) and ΔPC (inflation rate). Impact *trade-off* at 1981 ($\times 10$)

	Trade-off	Rank order	Stand. error (σ)	t-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	1.22	2	1.40	0.87	-0.18	.	-1.59	.
AG	0.34	5	0.38	0.89	-0.04	.	-0.42	.
TCSE	0.02	7	0.01	2.41	0.01	.	0.00	.
TACP	0.01	8	0.00	3.23	0.01	.	0.00	.
TAI	0.05	6	0.01	3.93	0.03	.	0.02	.
XTM	1.21	3	1.39	0.87	-0.18	.	-1.58	.
XPSOCT	1.22	1	1.40	0.87	-0.18	.	-1.58	.
XIS	1.12	4	1.20	0.93	-0.08	.	-1.28	.

Trade-off between CFX/PIB (trade bal. in points of GDP) and ΔPC (inflation rate). Impact *trade-off* at 1981 ($\times 10^{2}$)

	Trade-off	Rank order	Stand. error (σ)	t-ratio	*Trade-off* -σ	Rank order	*Trade-off* -2σ	Rank order
TCSS	3.46	1	3.93	0.88	-0.47	.	-4.40	.
AG	2.57	5	2.67	0.96	-0.10	.	-2.78	.
TCSE	0.19	7	0.03	5.84	0.16	.	0.13	.
TACP	0.15	8	0.02	8.57	0.13	.	0.12	
TAI	0.24	6	0.04	6.38	0.20	.	0.16	
XTM	3.46	2	3.93	0.88	-0.47	.	-4.40	.
XPSOCT	3.46	3	3.92	0.88	-0.46	.	-4.38	.
XIS	2.94	4	2.99	0.98	-0.05	.	-3.04	



6. MULTIPERIOD DYNAMIC SIMULATION

We consider in this section the case of a policy action *sustained* over a period of 4 years (1981-1984). The experiments will be performed in three different ways, according to the different nature of the constraint variables. For the government budget constraint (CFG, measured in billions of Francs) we first consider, for the numerator of the *trade-off* criterion, the sustained multiplier (according to its usual definition); it measures the expected change in the target obtained in the last year after a unit change in the instrument sustained over 4 years. However the denominator of the *trade-off* criterion cannot be taken as the sustained multiplier of government budget. Since in fact the policy action is sustained over four years, the expected loss for the government budget cumulates over the four periods. We use therefore the sustained multiplier of each instrument with respect to an auxiliary endogenous variable which is computed as the sum of CFG (government budget) over four consecutive years. So these *trade-offs* should be interpreted as the cumulated costs, using one particular instrument in the same way over the period, of an unitary change in the 4-years-cumulated deficit (in other words, multiplying the *trade-off* by four gives the effect, at the last period, of an unitary average change in the *government budget* over the whole period). The results obtained in this way are given in section 6.1.

In the following sections (6.2-6.4) we use a different computation method. Also for the numerator we introduce an auxiliary variable which is the sum of the target endogenous variable over four consecutive years;

the same is done for the constraint variable at the denominator of the *trade-off* criteria. Each *trade-off* will then result as the ratio of the sustained multipliers of the two variables. Since the result does not change dividing numerator and denominator by four, we can think at each *trade-off* as the average change in the target corresponding to an average unit change in the constraint variable.

In the last group of experiments (section 6.5) the computations are performed as in sections 6.2-6.4 for the target variables (the numerators). However, for the denominators, rather than cumulating the inflation rates over four years, we simply consider the change in the consumption price index in the fourth year (sustained multiplier of PC).

6.1. Government budget constraint

Let us first consider the point estimates of the *trade-offs*. Concerning *global activity* we see that the main change in the rank order with respect to the one-period case concerns XIS (tax on firms profits) which becomes highly efficient; regarding the values themselves, they show for each of the instruments a growing efficiency as they are higher than the division by four of the results of the one-period experiments; the same remark applies to each of the products (Q1 and Q2). Concerning the elements of *demand*, average effect on household consumption of an increase in revenue grows, as it is no longer reduced by the evolution of the savings ratio. For *investment*, the influence of XIS grows to the level of the other supply-side instruments; this comes mostly from the fact that its influence on prices through the lagged value of the profits rate, and so on competitiveness and demand, is now taken into account. Indeed we can see that decreasing XIS now improves exports, and that it

Trade-off between end of-period Q (added value) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade -off	Rank order	Stand error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.065	8	.009	-7.14	-.056	8	-.047	6
AG	-.099	5	.016	-6.16	-.083	4	-.067	1
TCSE	-.216	2	.097	-2.23	-.119	2	-.022	7
TACP	-.238	1	.112	-2.14	-.127	1	-.015	8
TAI	-.104	4	.025	-4.12	-.079	5	-.053	3
XTM	-.068	6	.009	-7.47	-.059	6	-.049	4
XPSOCT	-.065	7	.009	-7.20	-.056	7	-.047	5
XIS	-.162	3	.049	-3.27	-.112	3	-.063	2

Trade-off between end-of-period C (consumption) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade -off	Rank order	Stand error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.140	5	.007	-20.1	-.133	4	-.126	3
AG	-.065	8	.013	-5.03	-.052	8	-.039	8
TCSE	-.183	2	.051	-3.59	-.132	5	-.081	5
TACP	-.248	1	.068	-3.67	-.180	1	-.113	4
TAI	-.104	7	.020	-5.22	-.084	6	-.064	6
XTM	-.146	3	.007	-19.6	-.139	2	-.131	1
XPSOCT	-.141	4	.007	-20.0	-.134	3	-.127	2
XIS	-.117	6	.034	-3.45	-.083	7	-.049	7

Trade-off between end-of-period I (investment) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.012	8	.006	-2.16	-.007	8	-.001	.
AG	-.021	5	.011	-1.93	-.010	5	.001	.
TCSE	-.117	2	.070	-1.68	-.048	2	.022	.
TACP	-.119	1	.074	-1.61	-.045	3	.029	.
TAI	-.055	4	.020	-2.75	-.035	4	-.015	.
XTM	-.013	6	.006	-2.33	-.007	6	-.002	.
XPSOCT	-.012	7	.006	-2.21	-.007	7	-.001	.
XIS	-.110	3	.034	-3.26	-.076	1	-.043	.

Trade-off between end-of-period M (imports) and cumulated CFG (government budget) *Trade-off* 1981-1984

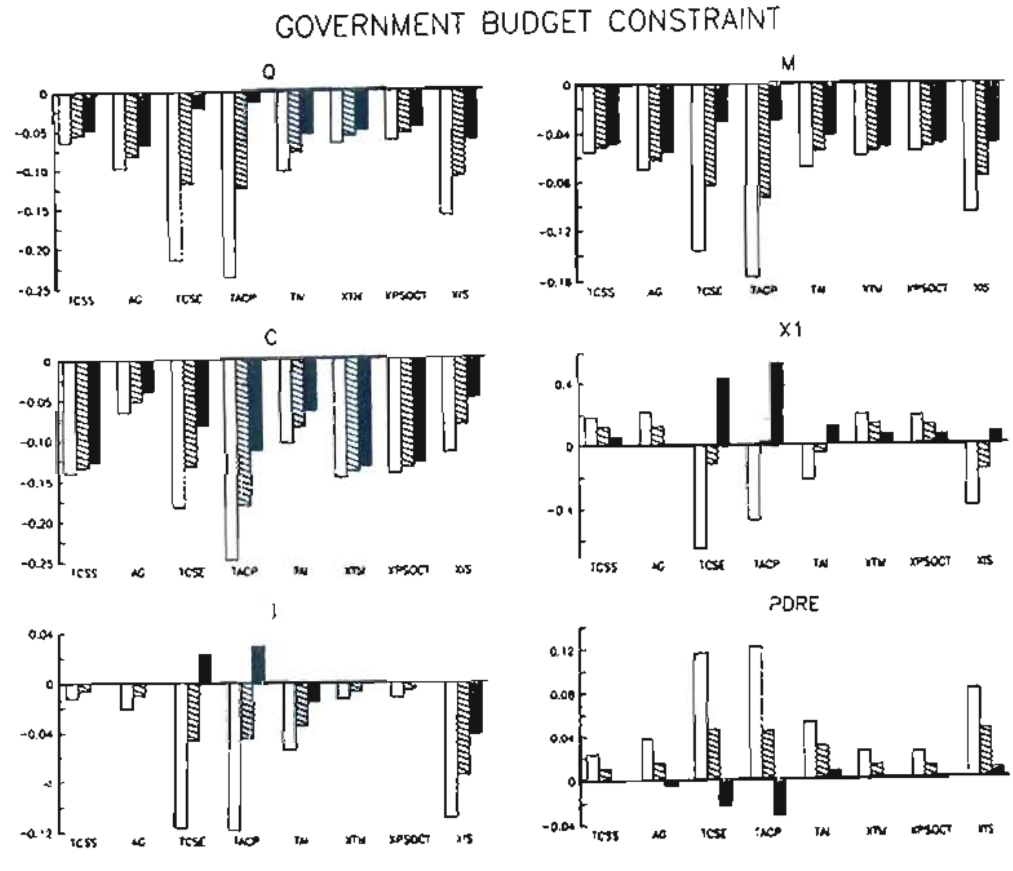
	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	-.056	8	.004	-13.5	-.052	8	-.048	5
AG	-.071	4	.008	-9.05	-.063	4	-.055	1
TCSE	-.137	2	.053	-2.56	-.083	2	-.030	7
TACP	-.158	1	.064	-2.46	-.094	1	-.030	8
TAI	-.070	5	.014	-5.01	-.056	5	-.042	6
XTM	-.060	6	.004	-14.1	-.056	6	-.051	2
XPSOCT	-.057	7	.004	-13.5	-.053	7	-.049	4
XIS	-.107	3	.029	-3.73	-.078	3	-.050	3

Trade-off between end-of-period X1 (exports) and cumulated CFG (government budget) *Trade-off* 1981-1984 (×10)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	183	.	.065	2.81	.118		053	
AG	.219	.	.098	2.23	.121		.023	
TCSE	- 655	.	.541	-1.21	-.114	.	.427	.
TACP	- 476		497	-.96	020	.	.517	.
TAI	-.218		.167	-1.30	-.051	.	117	.
XTM	.193	.	.065	2.97	128		.063	.
XPSOCT	.185	.	.064	2.88	.121	.	.057	
XIS	-.397		237	-1.68	- 160		.077	

Trade-off between end-of-period PDRE (unemployment) and cumulated CFG (government budget) *Trade-off* 1981-1984 ($\times 10^3$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* *σ	Rank order	*Trade-off* *2σ	Rank order
TCSS	.024	8	.013	1.85	.011	8	-.002	.
AG	.038	5	.022	1.75	.016	5	-.006	.
TCSE	.117	2	.070	1.66	.047	1	-.024	.
TACP	.122	1	.077	1.57	.044	3	-.033	.
TAI	.053	4	.023	2.33	.030	4	.008	.
XTM	.025	6	.013	1.88	.012	6	-.002	.
XPSOCT	.024	7	.013	1.86	.011	7	-.002	.
XIS	.082	3	.037	2.20	.044	2	.007	.



Trade-off between end-of-period Q (added value) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-.065	8	.009	-7.14	-.056	8	-.047	6
AG	-.099	5	.016	-6.16	-.083	4	-.067	1
TCSE	-.216	2	.097	-2.23	-.119	2	-.022	7
TACP	-.238	1	.112	-2.14	-.127	1	-.015	8
TAI	-.104	4	.025	-4.12	-.079	5	-.053	3
XTM	-.068	6	.009	-7.37	-.059	6	-.049	4
XPSOCT	-.065	7	.008	-7.30	-.056	7	-.047	5
XIS	-.162	3	.048	-3.27	-.112	3	-.063	2

Trade-off between end-of-period Q1 (added value-industrial) and cumulated CFG (government budget) *Trade-off* 1981-1984 (×10)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-.087	8	.040	-2.18	-.047	8	-.007	
AG	-.141	5	.076	-1.86	-.065	5	.010	.
TCSE	-.836	1	.465	-1.80	-.371	2	.094	.
TACP	-.822	2	.486	-1.69	-.336	3	.151	.
TAI	-.370	4	.128	-2.90	-.243	4	-.115	.
XTM	-.095	6	.040	-2.39	-.055	6	-.016	.
XPSOCT	-.090	7	.040	-2.24	-.050	7	-.010	.
XIS	-.667	3	.231	-2.89	-.436	1	-.205	.

Trade-off between end-of-period Q2 (added value-nonindustr) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade-off	Rank order	Stand. error (σ)	*t* ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-.056	8	.007	-7.68	-.049	8	-.041	4
AG	-.085	4	.009	-9.48	-.076	3	-.067	1
TCSE	-.132	2	.051	-2.57	-.081	2	-.029	7
TACP	-.156	1	.064	-2.44	-.092	1	-.028	8
TAI	-.067	5	.014	-4.93	-.053	5	-.040	6
XTM	-.058	6	.007	-7.89	-.051	6	-.043	2
XPSOCT	-.058	7	.007	-7.71	-.049	7	-.042	3
XIS	-.095	3	.027	-3.51	-.068	4	-.041	5

Trade-off between end-of-period PC (cosumption prices) and cumulated CFG (government budget) *Trade-off* 1981-1984 ($\times 10^5$)

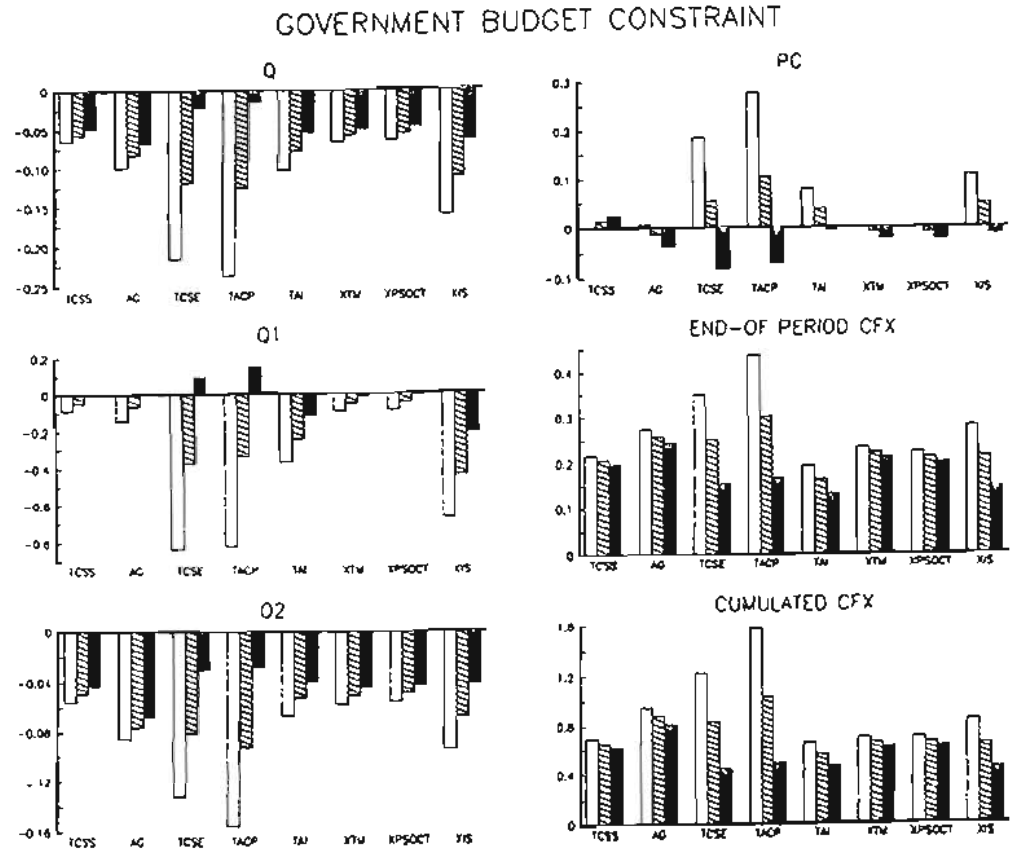
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-.00006	.	.012	-.01	.012	.	024	.
AG	.00571	5	.021	.27	-.015	.	-.036	.
TCSE	.18271	2	.132	1.38	.051	.	-.081	.
TACP	.27358	1	.172	1.59	.102	.	-.070	.
TAI	.07621	4	.041	1.87	.036	.	-.005	.
XTM	.00084	6	.012	.07	-.011	.	-.023	.
XPSOCT	.00026	7	.012	.02	-.012	.	-.024	.
XIS	.10446	3	.060	1.75	.045	.	-.015	.

Trade-off between end-of-period CFX (trade balance) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	.217	7	.010	21.28	.207	7	.197	4
AG	.274	4	.016	17.01	.258	2	.242	1
TCSE	.348	2	.097	3.56	.250	3	.153	6
TACP	.437	1	.136	3.22	.301	1	.165	5
TAI	.193	8	.031	6.25	.162	8	.131	8
XTM	.231	5	.011	21.00	.220	4	.209	2
XPSOCT	.221	6	.011	20.92	.211	6	.200	3
XIS	.279	3	.067	4.19	.213	5	.146	7

Trade-off between cumulated CFX (trade balance) and cumulated CFG (government budget) *Trade-off* 1981-1984

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	.700	5	.040	17.72	.661	4	.621	2
AG	.948	3	.069	13.75	.879	2	.810	1
TCSE	1.222	2	.391	3.12	.830	3	.439	8
TACP	1.578	1	.550	2.87	1.028	1	.478	5
TAI	.652	8	.100	6.55	.552	8	.453	6
XTM	.693	7	.040	17.33	.653	6	.613	4
XPSOCT	.695	6	.039	17.80	.655	5	.616	3
XIS	.837	4	.199	4.21	.638	7	.439	7



decreases prices, while the inflationary influence of demand stays at low level (although it is not as negligible as before). Lastly, the *trade-off* between the cumulated variation of *trade balance* and that of *government budget*, while still showing the same kind of rank order as before between supply-side instruments (plus *government demand*) and demand-side-ones, presents a smaller difference.

Concerning uncertainty, we can see that the significance observed in the one-period experiment (section 5.1) remains in effect in most cases. The most important exception concerns the efficiency of supply-side instruments on prices themselves, as to an initial deflationary effect they now add the contrary influence of the increase in activity: this explains the growth of the uncertainty on exports, as they are very sensitive to price competitiveness. TCSE and TACP show also no longer a significant influence on investment, mostly influenced by the increase in industrial demand and by profits. As to unemployment, the loss of significance of the increase in the production of the industrial sector, where job creation draws much more in the unemployed population than the non-industrial (where it attracts on the labor market a large number of previously unemployed), explains its unreliability for all instruments except XIS and TAI.

Indeed the second exception concerns the tax on firms profits and, to a smaller degree, the VAT rate on investment. As explained before, the main influence of the first one (though prices) now comes into play, while the second is less affected by uncertainty as it works only through profits.

If we now consider the evolution of the rank order, we can see indeed that the large increase in the uncertainty on TCSE and TACP, and the progress of the average influence of XIS, makes this last instrument the most certainly efficient on global demand (at the same level as government demand), while TCSE and TACP take now the last place (although they

can be considered as significantly efficient). If we separate the products, we see that for the industrial one only XIS and TAI can guarantee a significant non-negligible level, while for the non-industrial AG remains the most efficient, followed by all the others at the same level, except once more for TCSE and TACP.

As to the division into the elements of demand, the following considerations hold.

- As we have seen, only TAI and XIS can be used significantly to increase investment.
- Increasing household revenue now seems the most efficient way of increasing consumption, while TACP and TCSE keep a good place, due to their previous influence on employment and, more importantly, on the purchasing power of the wage rate.
- *Imports* follow demand as before.
- For *exports* we can no longer consider a rank order, as no instrument can be used to increase significantly exports, unless we do so by decreasing demand, in which case we get a low significant effect (in this case we can no longer speak of *trade-off*, as we increase government budget and exports at the same time).
- In the same manner the rank order on *unemployment* has a meaning only for TAI and XIS, which have (almost at the same level) a guaranteed efficiency.
- As to *trade balance* (cumulated over the period) the much higher precision of demand-side instruments inverts the rank order with (as we have already noted) a reduction of the intervals.

6.2. Government budget constraint (measured in points of GDP)

First, one general remark: the presentation of the results has been improved by taking into account in the numerator not the variation in the last period, but the cumulated variation over the four years period, to be coherent with the cumulated nature of the denominator (the other option: restricting the ratio to the fourth year variations only, would have overlooked the huge dynamic influences in the model formulations). Thus the new results are not directly comparable with those of the previous section, and will only be compared with the ones presented above in the one-period case.

Concerning point estimates, we still observe the existence of a *trade-off* between government budget and most variables; the only change concerns XIS (taxes on firms profits) which now increases exports if the government spends on it. Indeed, the change in the general influence of XIS is perhaps the most significant observation we can make: from a demand-side instrument working through investment (not yet productive), it becomes a supply-side one working through prices (influenced by the lagged profits ratio) and productive capacity.

Another change concerns consumption: the effectiveness of demand-side instruments increases, being less affected by the savings ratio. As to investment, the inertia of its variations explains the large increase in the *trade-off*.

Concerning the two products, we can see that the cost of increasing production gets higher in the non-industrial sector, particularly if we work through supply instruments, and it gets lower in the industrial sector: this sector is more sensitive to the sustained increase in price competitiveness and in investment.

As to unemployment, the large increase in efficiency is due to the

Trade-off between cumulated values of Q (added value) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	-0.79	6	0.11	-7.00	-0.68	6	-0.56	6
AG	-1.42	3	0.24	-6.02	-1.18	3	-0.95	1
TCSE	-2.37	2	0.90	-2.62	-1.47	2	-0.57	5
TACP	-2.55	1	0.96	-2.66	-1.59	1	-0.63	2
TAI	-1.16	5	0.26	-4.39	-0.89	5	-0.63	3
XTM	-0.78	8	0.11	-7.12	-0.67	8	-0.56	7
XPSOCT	-0.78	7	0.11	-7.08	-0.67	7	-0.56	8
XIS	-1.39	4	0.40	-3.43	-0.98	4	-0.58	4

Trade-off between cumulated values of C (consumption) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	-1.71	3	0.11	-15.51	-1.60	2	-1.49	1
AG	-0.75	8	0.13	-5.82	-0.62	8	-0.49	7
TCSE	-2.88	2	0.47	-4.04	-1.42	5	-0.95	5
TACP	-3.66	1	0.59	-4.49	-2.07	1	-1.48	2
TAI	-1.14	6	0.18	-6.30	-0.98	6	-0.78	6
XTM	-1.69	5	0.11	-15.35	-1.58	4	-1.47	4
XPSOCT	-1.70	4	0.11	-15.44	-1.55	3	-1.48	3
XIS	-0.97	7	0.25	-3.83	-0.72	7	-0.46	8

Trade-off between cumulated values of I (investment) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	-0.16	6	0.06	-2.67	-0.10	8	-0.04	6
AG	-0.30	5	0.13	-2.29	-0.17	5	-0.04	7
TCSE	-1.36	1	0.66	-2.07	-0.70	2	-0.05	3
TACP	-1.35	2	0.66	-2.04	-0.69	3	-0.03	8
TAI	-0.65	4	0.21	-3.15	-0.44	4	-0.24	2
XTM	-0.16	7	0.06	-2.76	-0.10	6	-0.04	4
XPSOCT	-0.16	8	0.06	-2.71	-0.10	7	-0.04	5
XIS	-1.24	3	0.34	-3.60	-0.90	1	-0.55	1

Trade-off between cumulated values of M (imports) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

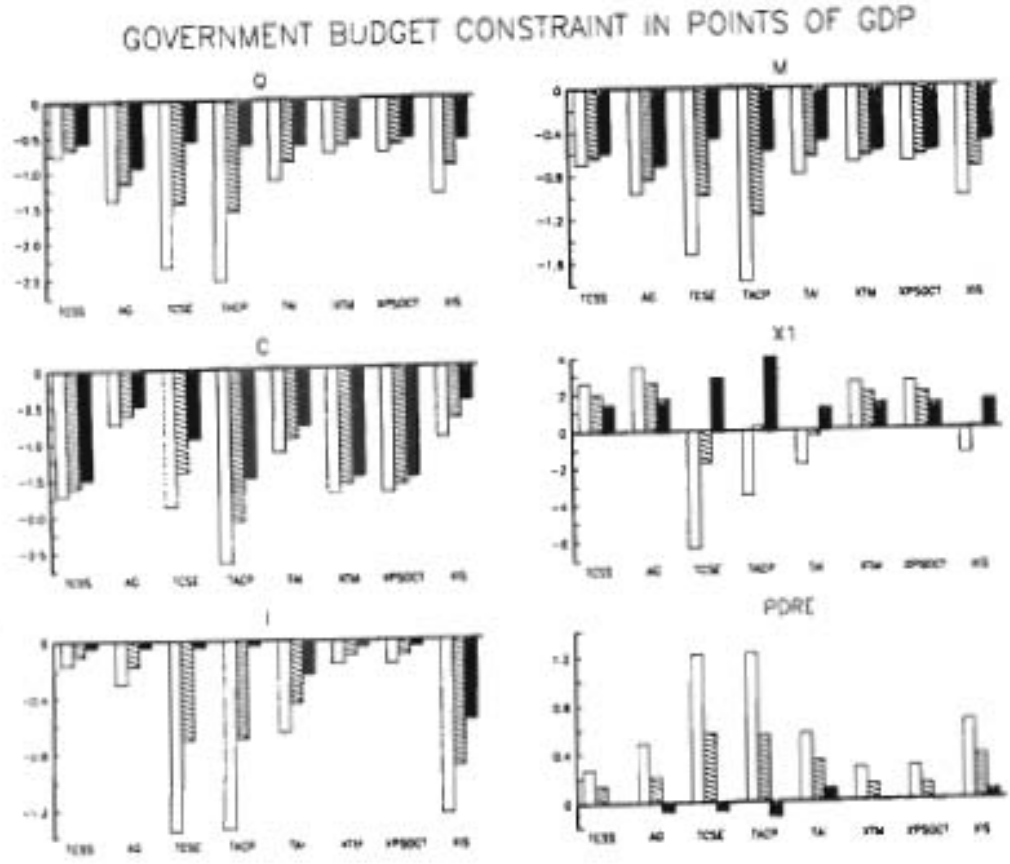
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	-0.71	6	0.06	-11.33	-0.65	5	-0.58	3
AG	-0.98	4	0.13	-7.70	-0.85	3	-0.72	1
TCSE	-1.54	2	0.54	-2.87	-1.01	2	-0.47	8
TACP	-1.78	1	0.60	-2.98	-1.18	1	-0.59	2
TAI	-0.81	5	0.16	-5.02	-0.65	7	-0.48	7
XTM	-0.71	7	0.06	-11.36	-0.65	6	-0.59	4
XPSOCT	-0.71	8	0.06	-11.38	-0.64	8	-0.58	5
XIS	-1.03	3	0.26	-3.95	-0.77	4	-0.51	6

Trade-off between cumulated values of X1 (exports) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-5}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	2.56	.	0.58	4.39	1.98	.	1.39	.
AG	3.49	.	0.87	4.01	2.62	.	1.75	.
TCSE	-6.35	.	4.58	-1.39	-1.77	.	2.81	.
TACP	-3.51	.	3.73	-0.94	-0.21	.	3.91	.
TAI	-1.86	.	1.50	-1.24	-0.35	.	1.15	.
XTM	2.53	.	0.57	4.44	1.96	.	1.39	.
XPSOCT	2.54	.	0.58	4.39	1.96	.	1.38	.
XIS	-1.38	.	1.43	-0.97	0.05	.	3.48	.

Trade-off between cumulated values of PDRE (unempl.) and CFG/PIB (gov. budget in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* %o	Rank order	*Trade-off* %2σ	Rank order
TCSS	0.28	6	0.14	1.98	0.14	6	0.00	.
AG	0.49	5	0.28	1.75	0.21	5	0.07	.
TCSE	1.21	2	0.64	1.89	0.57	1	0.07	.
TACP	1.22	1	0.67	1.83	0.55	2	0.11	.
TAI	0.56	4	0.23	2.44	0.33	4	0.10	.
XTM	0.27	8	0.14	1.94	0.14	8	0.00	.
XPSOCT	0.27	7	0.14	1.98	0.14	7	0.00	.
XIS	0.65	3	0.29	2.23	0.36	3	0.07	.



Trade-off between cumulated values of Q (added value) and CFG/PIB (gov. budget in points of GDP). Trade-off 1981-1984 (×10⁻⁶)

	Trade -off	Rank order	Stand. error (±)	t-ratio	Trade-off +σ	Rank order	Trade-off -2σ	Rank order
TCSS	-0.78	6	0.11	-7.00	-0.66	6	-0.56	6
AG	-1.42	2	0.24	-6.03	-1.18	2	-0.93	1
TCSE	-2.27	2	0.60	-3.83	-1.67	2	-0.57	5
TACP	-2.55	1	0.99	-2.66	-1.56	1	-0.63	2
TAI	-1.16	3	0.70	-4.39	-0.85	5	-0.63	3
XTM	-0.78	6	0.11	-7.12	-0.67	6	-0.56	7
XPSOCT	-0.78	7	0.11	-7.16	-0.67	7	-0.56	8
XIS	-1.39	4	0.40	-3.43	-0.98	4	-0.56	4

Trade-off between cumulated values of QI (added value-industrial) and CFG/PIB (gov. budget in points of GDP). Trade-off 1981-1984 (×10⁻⁶)

	Trade -off	Rank order	Stand. error (±)	t-ratio	Trade-off +σ	Rank order	Trade-off -2σ	Rank order
TCSS	-1.33	7	0.43	-3.11	-0.90	6	-0.48	7
AG	-2.12	5	0.69	-3.07	-1.43	5	-0.80	6
TCSE	-3.58	1	4.32	-1.21	-0.26	1	-0.64	1
TACP	-4.09	1	4.16	-1.21	-0.69	1	-0.69	1
TAI	-4.22	4	4.19	-1.21	-0.98	4	-0.69	4
XTM	-1.33	6	0.41	-3.23	-0.92	6	-0.50	6
XPSOCT	-1.33	6	0.42	-3.16	-0.91	7	-0.48	6
XIS	-3.56	8	1.84	-2.00	-3.72	8	-1.88	8

Trade-off between cumulated values of QI2 (added value-nonindustr. I and CFG/PIB (gov. budget in points of GDP). Trade-off 1981-1984 (×10⁻⁶)

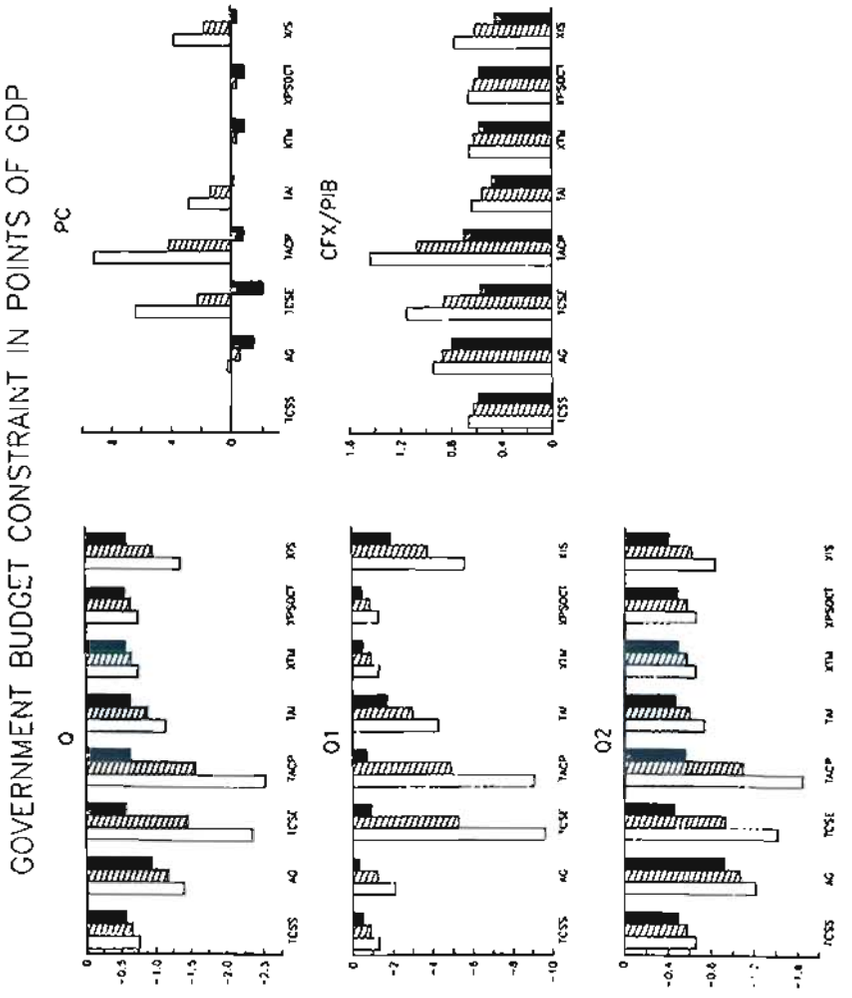
	Trade -off	Rank order	Stand. error (±)	t-ratio	Trade-off +σ	Rank order	Trade-off -2σ	Rank order
TCSS	-0.48	6	0.09	-7.37	-0.37	6	-0.48	1
AG	-1.71	3	0.15	-6.04	-1.08	3	-0.91	1
TCSE	-1.41	1	0.48	-2.86	-0.94	1	-0.48	8
TACP	-1.93	1	0.55	-3.30	-1.08	1	-0.55	1
TAI	-0.73	5	0.14	-5.13	-0.59	5	-0.45	1
XTM	-0.50	6	0.09	-7.45	-0.36	6	-0.47	5
XPSOCT	-0.45	7	0.09	-7.45	-0.36	7	-0.47	4
XIS	-0.83	4	0.22	-3.70	-0.61	4	-0.38	8

Trade-off between PC (consumption prices) and cumulated CFG/PIB (gov. budget in points of GDP). Trade-off 1981-1984

	Trade -off	Rank order	Stand. error (±)	t-ratio	Trade-off +σ	Rank order	Trade-off -2σ	Rank order
TCSS	0.00	8	0.46	0.01	-0.46		-0.92	
AG	0.00	5	0.83	0.01	-0.83		-1.65	
TCSE	6.32	2	4.11	1.53	2.15		-1.81	
TACP	8.13	1	4.08	1.83	4.12		-0.05	
TAI	2.76	4	1.46	1.91	1.31		-0.15	
XTM	0.00	6	0.46	0.01	-0.43		-0.89	
XPSOCT	0.01	7	0.46	0.03	-0.45		-0.91	
XIS	3.76	3	2.09	1.79	1.66		-0.43	

Trade-off between cumulated values of CFG/PIB (trade bal. I and CFG/PIB (gov. budget, both measured in points of GDP). Trade-off 1981-1984

	Trade -off	Rank order	Stand. error (±)	t-ratio	Trade-off +σ	Rank order	Trade-off -2σ	Rank order
TCSS	0.67	5	0.04	15.37	0.62	4	0.58	3
AG	0.94	3	0.07	13.69	0.87	3	0.80	3
TCSE	1.15	1	0.29	3.91	0.85	1	0.58	1
TACP	1.44	1	0.37	3.84	1.06	1	0.69	1
TAI	0.64	4	0.08	7.83	0.56	5	0.47	4
XTM	0.68	5	0.04	15.11	0.62	4	0.58	3
XPSOCT	0.68	4	0.04	15.40	0.62	3	0.58	4
XIS	0.77	4	0.16	4.88	0.61	4	0.45	4



slowness of the adjustment of actual employment variation to its desired value (moreover, this value keeps increasing too). Finally, concerning inflation, the efficiency on the cumulated rate (in other terms, of the price index) gets lower with the rise of tensions on productive capacity and labor market.

Let us now consider the uncertainty aspect. On global activity, the high standard errors on the supply-side instruments combined with the increased average level of demand-side ones (and of XIS) produce almost equal guaranteed values, except for the slightly higher value on government demand. But this similarity results from a combination of contrary effects

- The high precision on *consumption* of instruments increasing household revenue makes them the most efficient, along with TACP which affects the purchasing power of non-wage revenue and the savings ratio.
- On *investment*, some supply instruments (XIS, TAI) give a significantly higher value.
- On *exports*, no instrument shows a significant *trade-off*, but the lower bound of the reduction of exports accompanying an increase in global activity is very clearly associated with supply-side instruments.

Keeping in mind these considerations, it is not surprising that supply-side instruments will give better guaranteed statistics for the industrial product, and comparable ones for the non-industrial. We finally note the following.

- *Unemployment*: it shows as before only marginally significant *trade-offs*, whatever the instrument considered.
- *Prices*: although the average value has increased, the high uncertainty of supply-side *trade offs* does not allow them to stay significant; thus no guaranteed efficiency can be clearly defined.
- *Trade balance*: the higher precision of the least efficient (demand-side) instruments levels the guaranteed values, except for

government demand (AG) which costs more in terms of trade balance than other instruments (although it is mostly composed of non-industrial products).

On the whole, the introduction of the uncertainty element levels the hierarchy of the *trade-offs* on the main economic variables: prices, GDP, trade balance.

6.3. *Trade balance constraint (measured in points of GDP)*

Again, we find that there is almost always a cost in terms of trade balance to improve any economic element, except of course for imports, and exports if we use demand-side instruments. But on the whole this cost seems to be decreasing. As to relative values, concerning global activity supply-side instruments still seem the most efficient, due to their influence on industrial production through price competitiveness and exports, while firms investment and household consumption are especially sensitive to the instruments affecting the account of the associated agent. But the observations on precision change significantly.

- Global precision decreases, mostly because of the industrial product, especially sensitive to exports and investment, which are subject to two contrary influences: tensions and prices for exports, tensions and profits for investment. At the same time, the increased precision on consumption (due to the stabilization of the savings ratio) helps the non-industrial product to keep the same level of precision. This evolution is the inverse of the one observed for the government budget *trade-off*: the link between activity and trade balance loses precision, while the link between government spending and activity gets more precise with time.

Trade-off between cumulated values of M (imports) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-1.06	7	0.07	-15.87	-0.99	7	-0.93	7
AG	-1.04	8	0.07	-15.47	-0.97	8	-0.90	8
TCSE	-1.34	1	0.20	-6.36	-1.14	2	-0.93	4
TACP	-1.24	4	0.14	-8.85	-1.10	4	-0.96	3
TAI	-1.26	3	0.15	-8.39	-1.11	3	-0.96	2
XTM	-1.07	5	0.07	-15.82	-1.00	5	-0.93	5
XPSOCT	-1.06	6	0.07	-15.82	-1.00	6	-0.93	6
XIS	-1.34	2	0.13	-10.56	-1.21	1	-1.08	1

Trade-off between cumulated values of X1 (exports) and CFX/PIB (trade bal in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-5}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	3.83	.	0.85	4.48	2.98	.	2.12	.
AG	3.70	.	1.12	3.30	2.57	.	1.45	.
TCSE	-5.53	.	3.00	-1.84	-2.52	.	0.48	.
TACP	-2.44	.	2.10	-1.16	-0.34	.	1.76	.
TAI	-2.91	.	2.21	-1.32	-0.71	.	1.50	.
XTM	3.82	.	0.83	4.58	2.98	.	2.15	.
XPSOCT	3.83	.	0.85	4.52	2.98	.	2.13	.
XIS	-1.80	.	1.69	-1.06	-0.11	.	1.58	.

Trade-off between cumulated values of PDRE (unempl.) and CFX/PIB (trade bal. in points of GDP) *Trade-off* 1981-1984 ($\times 10^{-4}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	0.41	6	0.21	2.00	0.21	6	-0.00	.
AG	0.52	5	0.28	1.86	0.24	5	-0.04	.
TCSE	1.06	1	0.38	2.77	0.67	1	0.29	.
TACP	0.85	3	0.31	2.74	0.54	4	0.23	.
TAI	0.88	2	0.32	2.78	0.56	3	0.25	.
XTM	0.41	8	0.20	2.01	0.21	8	0.00	.
XPSOCT	0.41	7	0.21	2.00	0.21	7	0.00	.
XIS	0.85	4	0.28	3.01	0.56	2	0.28	.

Trade-off between cumulated values of O (added value) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-1.18	6	0.15	-8.06	-1.03	7	-0.89	8
AG	-1.50	5	0.15	-10.02	-1.35	5	-1.20	5
TCSE	-2.16	1	0.36	-5.80	-1.71	1	-1.35	1
TACP	-1.77	4	0.26	-6.80	-1.51	4	-1.26	4
TAI	-1.82	2	0.27	-6.73	-1.55	3	-1.28	3
XTM	-1.18	8	0.14	-8.12	-1.03	8	-0.89	7
XPSOCT	-1.18	7	0.15	-8.09	-1.03	6	-0.89	6
XIS	-1.81	3	0.24	-7.62	-1.57	2	-1.33	2

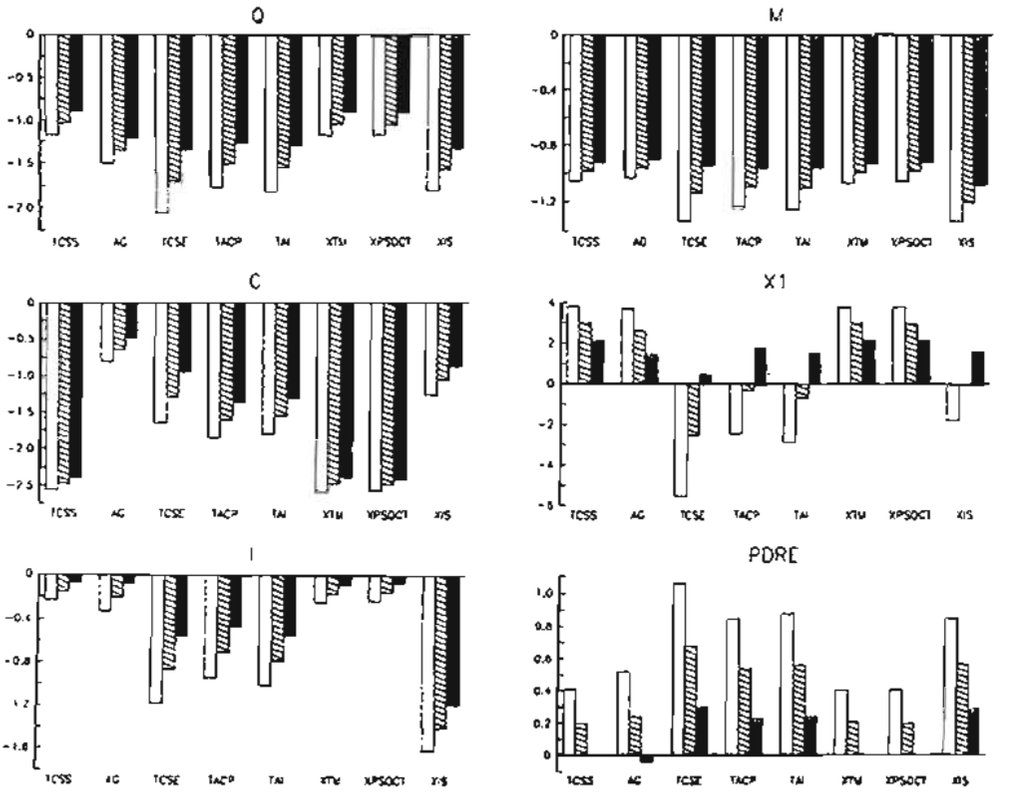
Trade-off between cumulated values of C (consumption) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.56	1	0.09	-26.95	-2.46	1	-2.37	1
AG	-0.80	8	0.16	-5.03	-0.64	8	-0.48	8
TCSE	-1.64	6	0.35	-4.75	-1.29	6	-0.95	6
TACP	-1.85	4	0.25	-7.43	-1.60	4	-1.35	4
TAI	-1.79	5	0.25	-7.14	-1.54	5	-1.29	5
XTM	-2.55	3	0.09	-27.02	-2.46	3	-2.37	3
XPSOCT	-2.56	2	0.09	-26.99	-2.46	2	-2.37	2
XIS	-1.26	7	0.20	-6.32	-1.06	7	-0.86	7

Trade-off between cumulated values of I (investment) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade-off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.23	8	0.08	-2.76	-0.15	8	-0.06	8
AG	-0.32	5	0.12	-2.71	-0.20	5	-0.08	5
TCSE	-1.18	2	0.32	-3.70	-0.86	2	-0.54	2
TACP	-0.94	4	0.24	-3.93	-0.70	4	-0.46	4
TAI	-1.01	3	0.24	-4.25	-0.78	3	-0.54	3
XTM	-0.24	6	0.08	-2.84	-0.15	6	-0.07	6
XPSOCT	-0.23	7	0.08	-2.79	-0.15	7	-0.07	7
XIS	-1.62	1	0.22	-7.27	-1.40	1	-1.17	1

TRADE BALANCE CONSTRAINT IN POINTS OF GDP



Trade-off between cumulated values of Q (added value) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off -σ*	Rank order	*Trade-off +2σ*	Rank order
TCSS	-1.18	6	0.15	-8.06	-1.03	7	-0.89	8
AG	-1.50	5	0.15	-10.62	-1.35	5	-1.20	5
TCSE	-2.06	1	0.36	-5.60	-1.71	1	-1.35	1
TACP	-1.77	4	0.26	-6.89	-1.51	4	-1.26	4
TAI	-1.82	3	0.27	-6.73	-1.55	3	-1.28	3
XTM	-1.18	8	0.14	-8.13	-1.03	8	-0.89	7
XPSOCT	-1.18	7	0.15	-8.09	-1.03	6	-0.89	6
XIS	-1.81	3	0.24	-7.62	-1.57	2	-1.33	2

Trade-off between cumulated values of Q1 (added value-industrial) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-5}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off -σ*	Rank order	*Trade-off +2σ*	Rank order
TCSS	-1.98	8	0.61	-3.25	-1.38	8	-0.76	7
AG	-2.23	5	0.80	-2.81	-1.45	5	-0.65	8
TCSE	-8.34	1	2.03	-4.11	-6.31	1	-4.28	2
TACP	-6.29	4	1.44	-4.36	-4.84	4	-3.40	4
TAI	-6.79	3	1.51	-4.49	-5.28	3	-3.78	3
XTM	-2.01	6	0.60	-3.34	-1.41	6	-0.81	5
XPSOCT	-1.98	7	0.61	-3.26	-1.38	7	-0.78	6
XIS	-7.29	2	1.29	-5.62	-5.96	2	-4.67	1

Trade-off between cumulated values of Q2 (added value-nonindust.) and CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984 ($\times 10^{-6}$)

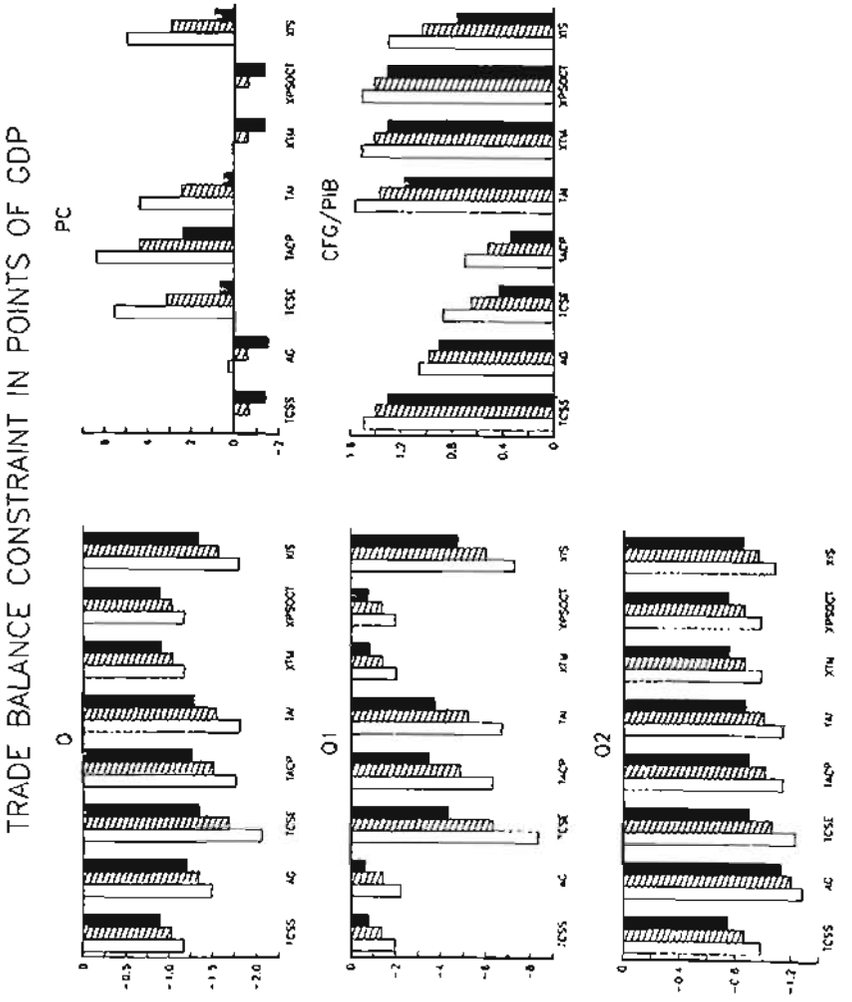
	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off -σ*	Rank order	*Trade-off +2σ*	Rank order
TCSS	-0.98	6	0.12	-8.43	-0.86	6	-0.75	6
AG	-1.28	1	0.08	-16.06	-1.20	1	-1.12	1
TCSE	-1.23	2	0.17	-7.16	-1.06	2	-0.89	2
TACP	-1.14	4	0.13	-8.63	-1.01	3	-0.88	3
TAI	-1.14	3	0.14	-8.33	-1.01	4	-0.87	4
XTM	-0.98	8	0.12	-8.44	-0.86	8	-0.74	8
XPSOCT	-0.98	7	0.12	-8.45	-0.86	7	-0.75	7
XIS	-1.06	5	0.12	-9.11	-0.96	5	-0.85	5

Trade-off between PC (consumption prices) and cumulated CFX/PIB (trade bal. in points of GDP). *Trade-off* 1981-1984

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off -σ*	Rank order	*Trade-off +2σ*	Rank order
TCSS	0.00	8	0.69	0.01	-0.69	.	-1.38	.
AG	0.24	5	0.86	0.28	-0.62	.	-1.48	.
TCSE	5.51	2	2.45	2.25	3.06	.	0.61	.
TACP	6.34	1	2.01	3.15	4.33	.	2.32	.
TAI	4.33	4	1.94	2.24	2.40	.	0.46	.
XTM	0.05	6	0.70	0.07	-0.65	.	-1.35	.
XPSOCT	0.02	7	0.69	0.02	-0.68	.	-1.37	.
XIS	4.90	3	2.04	2.40	2.85	.	0.81	.

Trade-off between cumul. values of CFG/PIB (gov. budget) and CFX/PIB (trade bal., both in points of GDP). *Trade-off* 1981-1984

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off -σ*	Rank order	*Trade-off -2σ*	Rank order
TCSS	1.50	4	0.10	15.52	1.40	3	1.30	3
AG	1.06	6	0.08	12.84	0.98	6	0.89	5
TCSE	0.82	7	0.22	3.90	0.65	7	0.42	7
TACP	0.70	8	0.18	3.84	0.51	8	0.33	8
TAI	1.57	1	0.20	7.83	1.37	4	1.17	4
XTM	1.51	2	0.10	15.21	1.41	2	1.31	2
XPSOCT	1.51	3	0.10	15.40	1.41	1	1.31	1
XIS	1.30	5	0.27	4.88	1.04	5	0.77	6



- Although the uncertainty on supply-side instruments (including now XIS) is larger, their guaranteed values are still the highest by a rather wide margin.
- For prices, there is still a significant *trade-off* for supply instruments, but with a rather low value.
- The hierarchy on the government budget *trade-off* is not changed too much.

6.4. Unemployment constraint

Again the only *trade-offs* (in the usual sense) are with imports, and exports for demand-side instruments (including now XIS).

Concerning precision, the general significance observed in the one-period case is affected by a slight decrease of the *t-ratios* in almost all cases, coming mainly as above from the industrial product, exports and investment. But on the whole, the signs of the *trade-offs* are not far from being significant.

As before, the hierarchy between demand and supply-side instruments changes in favor of the latter if we consider guaranteed values. This is also true for the actual *trade-offs* on imports, while for exports, the *trade-offs* associated with demand instruments are not really significant.

Trade-off between cumulated values of Q (added value) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.84	4	1.40	-2.03	-1.44	6	-0.04	
AG	-2.88	1	1.51	-1.91	-1.37	8	0.14	
TCSE	-1.96	8	0.55	-3.56	-1.41	7	-0.86	
TACP	-2.09	6	0.65	-3.21	-1.44	5	-0.79	
TAI	-2.07	7	0.62	-3.31	-1.44	4	-0.82	
XTM	-2.87	2	1.41	-2.03	-1.46	2	-0.05	
XPSOCT	-2.85	3	1.40	-2.03	-1.45	3	-0.04	
XIS	-2.14	5	0.61	-3.52	-1.53	1	-0.92	

Trade-off between cumulated values of C (consumption) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-6.16	3	3.07	-2.01	-3.09	3	-0.03	
AG	-1.52	7	0.95	-1.61	-0.58	8	0.37	
TCSE	-1.55	6	0.72	-2.14	-0.83	7	-0.10	
TACP	-2.18	4	0.93	-2.36	-1.26	4	-0.34	
TAI	-2.04	5	0.86	-2.38	-1.18	5	-0.33	
XTM	-6.23	1	3.09	-2.02	-3.14	1	-0.05	
XPSOCT	-6.18	2	3.07	-2.01	-3.11	2	-0.04	
XIS	-1.49	8	0.59	-2.51	-0.90	6	-0.30	

Trade-off between cumulated values of I (investment) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

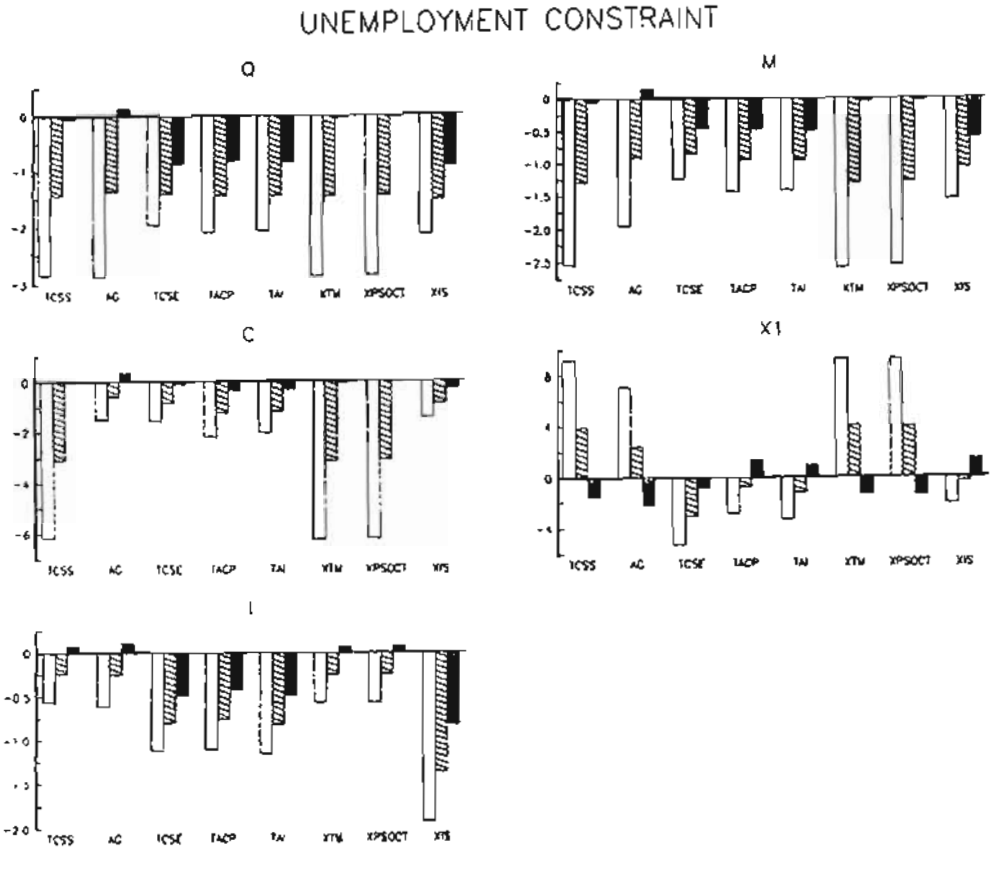
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.56	8	0.32	-1.79	-0.25	7	0.07	
AG	-0.61	5	0.36	-1.67	-0.25	8	0.12	
TCSE	-1.12	3	0.32	-3.51	-0.80	3	-0.48	
TACP	-1.11	4	0.35	-3.20	-0.76	4	-0.42	
TAI	-1.16	2	0.34	-3.39	-0.82	2	-0.48	
XTM	-0.57	6	0.32	-1.81	-0.26	5	0.06	
XPSOCT	-0.57	7	0.32	-1.79	-0.25	6	0.07	
XIS	-1.92	1	0.55	-3.49	-1.37	1	-0.82	

Trade-off between cumulated values of M (imports) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.56	3	1.25	-2.04	-1.30	3	-0.05	
AG	-1.98	4	1.05	-1.89	-0.93	7	0.11	
TCSE	-1.27	8	0.40	-3.17	-0.87	8	-0.47	
TACP	-1.46	6	0.49	-3.00	-0.97	5	-0.49	
TAI	-1.44	7	0.47	-3.08	-0.97	6	-0.50	
XTM	-2.60	1	1.27	-2.05	-1.33	1	-0.06	
XPSOCT	-2.57	2	1.26	-2.04	-1.31	2	-0.05	
XIS	-1.58	5	0.48	-3.29	-1.10	4	-0.62	

Trade-off between cumulated values of X1 (exports) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-1}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	9.23		5.33	1.73	3.91		-1.42	
AG	7.07		4.62	1.53	2.46		-2.16	
TCSE	-5.24		2.21	-2.37	-3.03		-0.83	
TACP	-2.88		2.11	-1.37	-0.78		1.33	
TAI	-3.32		2.10	-1.58	-1.22		0.88	
XTM	9.30		5.32	1.75	3.98		-1.34	
XPSOCT	9.25		5.32	1.74	3.93		-1.39	
XIS	-2.13		1.76	-1.21	-0.37		1.39	



Trade-off between cumulated values of Q (added value) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.84	4	1.40	-2.03	-1.44	6	-0.04	.
AG	-2.88	1	1.51	-1.91	-1.37	8	0.14	.
TCSE	-1.96	8	0.55	-3.56	-1.41	7	-0.86	.
TACP	-2.09	6	0.65	-3.21	-1.44	5	-0.79	.
TAI	-2.07	7	0.62	-3.31	-1.44	4	-0.82	.
XTM	-2.87	2	1.41	-2.03	-1.46	2	-0.05	.
XPSOCT	-2.85	3	1.40	-2.03	-1.45	3	-0.04	.
XIS	-2.14	5	0.61	-3.52	-1.53	1	-0.92	.

Trade-off between PC (consumption prices) and cumulated PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{4}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-0.01	.	1.66	-0.01	1.65	.	3.32	.
AG	0.45	.	1.63	0.28	-1.17	.	-2.80	.
TCSE	5.22	.	2.05	2.54	3.16	.	1.11	.
TACP	7.49	.	2.57	2.92	4.92	.	2.36	.
TAI	4.94	.	2.06	2.40	2.88	.	0.83	.
XTM	0.12	.	1.69	0.07	-1.57	.	-3.26	.
XPSOCT	0.04	.	1.67	0.02	-1.64	.	-3.31	.
XIS	5.80	.	2.45	2.37	3.35	.	0.90	.

Trade-off between cumulated values of Q1 (added value-industrial) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-1}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-4.79	7	2.57	-1.86	-2.22	7	0.35	.
AG	-4.29	6	2.54	-1.69	-1.75	8	0.79	.
TCSE	-7.91	2	2.06	-3.85	-5.85	2	-3.60	.
TACP	-7.42	4	2.19	-3.39	-5.23	4	-3.04	.
TAI	-7.64	3	2.17	-3.52	-5.47	3	-3.30	.
XTM	-4.80	5	2.60	-1.88	-2.29	5	0.31	.
XPSOCT	-4.82	6	2.58	-1.87	-2.24	6	0.34	.
XIS	-8.58	1	2.32	-3.70	-6.26	1	-3.94	.

Trade-off between cumulated values of CFG/PIB (gov. budget in points of GDP) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{4}$)

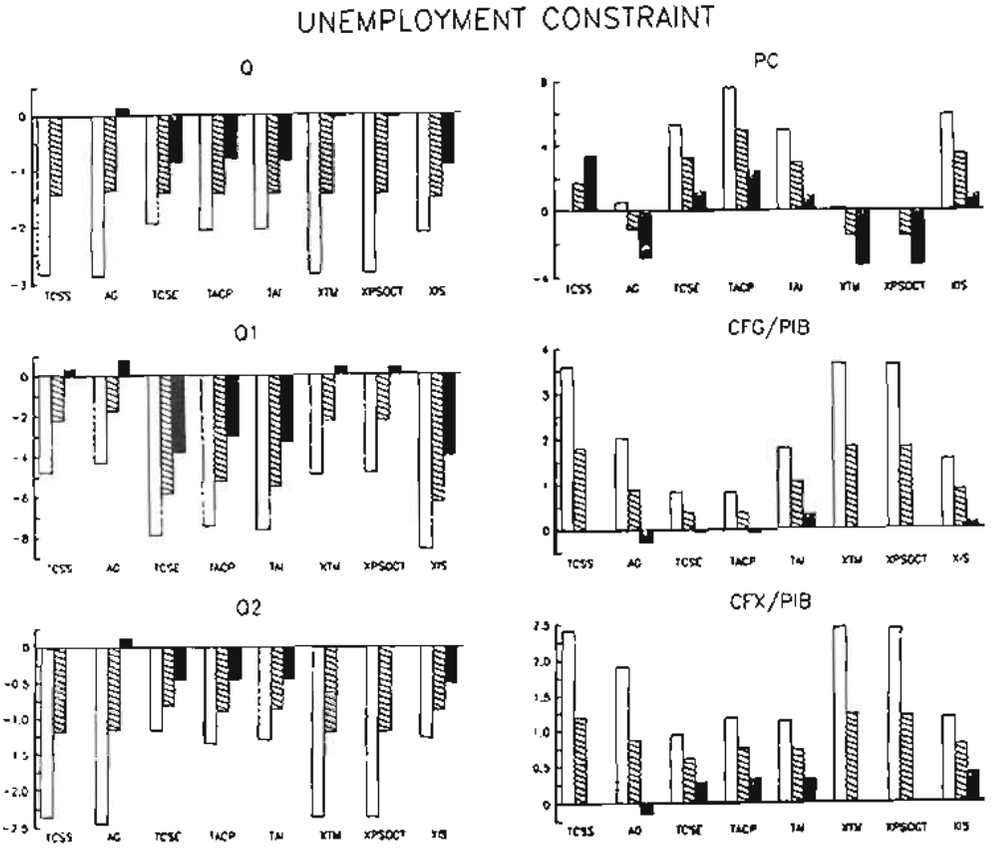
	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	3.61	3	1.82	1.98	1.79	3	-0.03	.
AG	2.03	4	1.16	1.75	0.87	5	-0.29	.
TCSE	0.83	7	0.44	1.89	0.39	7	-0.05	.
TACP	0.82	8	0.45	1.83	0.37	8	-0.08	.
TAI	1.79	5	0.73	2.44	1.06	4	0.32	.
XTM	3.67	1	1.85	1.99	1.83	1	-0.02	.
XPSOCT	3.64	2	1.83	1.99	1.81	2	-0.03	.
XIS	1.54	6	0.69	2.23	0.85	6	0.16	.

Trade-off between cumulated values of Q2 (added value-nonindust I and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-2.36	4	1.18	-2.00	-1.18	3	-0.00	.
AG	-2.45	1	1.29	-1.90	-1.16	4	0.13	.
TCSE	-1.17	8	0.36	-3.22	-0.80	8	-0.44	.
TACP	-1.35	5	0.45	-2.98	-0.90	5	-0.44	.
TAI	-1.30	6	0.43	-3.02	-0.88	7	-0.45	.
XTM	-2.38	2	1.18	-2.01	-1.20	1	-0.01	.
XPSOCT	-2.37	3	1.18	-2.01	-1.19	2	-0.01	.
XIS	-1.78	7	0.39	-3.32	-0.90	6	-0.51	.

Trade-off between cumulated values of CFX/PIB (trade bal. in points of GDP) and PDRE (unemployment). *Trade-off* 1981-1984 ($\times 10^{4}$)

	Trade-off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	2.41	3	1.21	2.00	1.20	3	-0.00	.
AG	1.91	4	1.03	1.86	0.89	4	-0.14	.
TCSE	0.95	8	0.34	2.77	0.61	8	0.26	.
TACP	1.18	6	0.43	2.74	0.75	6	0.32	.
TAI	1.14	7	0.41	2.78	0.73	7	0.32	.
XTM	2.44	1	1.21	2.01	1.22	1	0.01	.
XPSOCT	2.42	2	1.21	2.00	1.21	2	0.00	.
XIS	1.18	5	0.39	3.01	0.79	5	0.40	.



6.5. Inflation constraint

This experiment represents a special case: while supply-side instruments link an increase in activity with a decrease of inflation, the effect in the fourth year of demand-side instruments on inflation is very small. It is so small, in fact, that for quite similar instruments as TCSS (social security rate for workers) and XPSOCT (social benefits) the sign is different. Thus the comparison of these values to a sizable uncertainty gives extremely low *t*-values: we cannot say anything about *trade-offs* using demand-side instruments.

Concerning supply-side ones, they generally stay significant, but with a much decreased precision (especially for investment and exports), the greater *t*-value of TACP (VAT rate on consumption) helping this instrument to present, in particular for imports, a larger guaranteed value.

Trade-off between cumulated value of Q (added value) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	3.35	1	0.22	0.04	0.16	.	0.38	.
AG	-0.06	4	0.10	-0.28	-0.00	.	-0.00	.
TCSE	-0.00	6	0.10	-2.85	-0.00	.	-0.00	.
TACP	-0.09	8	0.00	-4.55	-0.00	.	-0.00	.
TAI	-0.00	5	0.00	-2.89	-0.00	.	-0.00	.
XTM	-0.24	3	3.41	-0.07	3.17	.	6.58	.
XPSOCT	-0.78	2	0.00	-0.02	.	.	.	.
XIS	-0.00	7	0.00	-3.01	-0.00	.	-0.00	.

Trade-off between cumulated value of C (consumption) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	7.25	1	0.00	0.00	.	.	.	.
AG	-0.03	4	0.13	-0.27	0.09	.	0.22	.
TCSE	-0.00	6	0.00	-1.70	-0.00	.	0.00	.
TACP	-0.00	7	0.00	-2.89	-0.00	.	-0.00	.
TAI	-0.00	5	0.00	-1.69	-0.00	.	0.00	.
XTM	0.52	3	7.45	-0.07	6.93	.	14.37	.
XPSOCT	-1.70	2	.	-0.02	.	.	.	.
XIS	-0.00	8	0.00	-2.20	-0.00	.	-0.00	.

Trade-off between cumulated value of I (investment) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-7}$)

	Trade -off	Rank order	Stand error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	6.65	1	0.00	0.00	.	.	.	.
AG	-0.13	4	0.44	-0.30	0.31	.	0.75	.
TCSE	-0.02	7	0.01	-3.66	-0.02	.	-0.01	.
TACP	-0.01	8	0.00	-5.45	-0.01	.	-0.01	.
TAI	-0.02	6	0.01	-3.41	-0.02	.	-0.01	.
XTM	-0.48	3	6.70	-0.07	6.22	.	12.92	.
XPSOCT	-1.56	2	.	-0.02	.	.	.	.
XIS	-0.03	5	0.01	-2.65	-0.02	.	-0.01	.

Trade-off between cumulated value of M (imports) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	3.01	1	.	0.00	.	.	.	.
AG	-0.04	4	0.16	-0.28	0.11	.	0.27	.
TCSE	-0.00	7	0.00	-3.37	-0.00	.	-0.00	.
TACP	-0.00	8	0.00	-3.56	-0.00	.	-0.00	.
TAI	-0.00	5	0.00	-2.56	-0.00	.	-0.00	.
XTM	-0.22	3	3.10	-0.07	2.88	.	5.99	.
XPSOCT	-0.71	2	.	-0.02	.	.	.	.
XIS	-0.00	6	0.00	-2.72	-0.00	.	-0.00	.

Trade-off between cumulated value of XI (exports) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-1.09	1	.	-0.00	.	.	.	.
AG	-0.02	4	0.06	-0.36	-0.05	.	-0.11	.
TCSE	-0.00	5	0.00	-3.05	-0.00	.	-0.00	.
TACP	-0.00	7	0.00	-1.62	-0.00	.	-0.00	.
TAI	-0.00	6	0.00	-2.14	-0.00	.	-0.00	.
XTM	-0.08	3	1.13	-0.07	-1.05	.	-2.18	.
XPSOCT	0.25	2	.	-0.02	.	.	.	.
XIS	-0.00	8	0.00	-3.51	-0.00	.	0.00	.

Trade-off between cumulated value of PDRE (unemployment) and PC (end-of-period consumption price) *Trade-off* 1981-1984 ($\times 10^{6}$)

	Trade -off	Rank order	Stand. error (σ)	*t*-ratio	*Trade-off* ±σ	Rank order	*Trade-off* ±2σ	Rank order
TCSS	-1.18	1	.	-0.00	.	.	.	.
AG	0.02	4	0.08	0.38	0.06	.	0.14	.
TCSE	0.00	6	0.00	2.03	0.00	.	0.00	.
TACP	0.00	8	0.00	2.92	0.00	.	0.00	.
TAI	0.00	5	0.00	2.40	0.00	.	0.00	.
XTM	0.08	3	1.19	0.07	1.11	.	2.30	.
XPSOCT	0.27	2	.	0.02	.	.	.	.
XIS	0.00	7	0.00	2.37	0.00	.	0.00	.

Trade-off between cumulated value of Q (added value) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* $\pm\sigma$	Rank order	*Trade-off* $\pm 2\sigma$	Rank order
TCSS	3.35	1	....	0.00	....	.	....	
AG	-0.06	4	0.22	-0.28	0.16	.	0.38	.
TCSE	-0.00	6	0.00	-2.95	-0.00	.	-0.00	.
TACP	-0.00	8	0.00	-4.55	-0.00	.	-0.00	.
TAI	-0.00	5	0.00	-2.89	-0.00	.	-0.00	.
XTM	-0.24	3	3.41	-0.07	3.17	.	6.58	.
XPSOCT	-0.78	2	....	-0.02	....	.	....	.
XIS	-0.00	7	0.00	-3.01	-0.00	.	-0.00	.

Trade-off between cumulated value of Q1 (added value-industrial) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-7}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* $\pm\sigma$	Rank order	*Trade-off* $\pm 2\sigma$	Rank order
TCSS	5.64	1	..	0.00	....	.	....	.
AG	-0.09	4	0.31	-0.30	0.22	.	0.53	.
TCSE	-0.02	6	0.00	-3.52	-0.01	.	-0.01	.
TACP	-0.01	8	0.00	-5.99	-0.01	.	-0.01	.
TAI	-0.02	5	0.00	-3.49	-0.01	.	-0.01	.
XTM	-0.41	3	5.74	-0.07	5.33	.	11.07	.
XPSOCT	-1.32	2	....	-0.02	....	.	....	.
XIS	-0.01	7	0.00	-3.23	-0.01	.	-0.01	.

Trade-off between cumulated value of Q2 (added value-nonindust.) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-8}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* $\pm\sigma$	Rank order	*Trade-off* $\pm 2\sigma$	Rank order
TCSS	2.78	1	....	0.00	....	.	....	.
AG	-0.05	4	0.19	-0.28	0.14	.	0.33	.
TCSE	-0.00	6	0.00	-2.60	-0.00	.	-0.00	.
TACP	-0.00	8	0.00	-3.79	-0.00	.	-0.00	.
TAI	-0.00	5	0.00	-2.57	-0.00	.	-0.00	.
XTM	-0.20	3	2.84	-0.07	2.64	.	5.47	.
XPSOCT	-0.65	2	....	-0.02	....	.	....	.
XIS	-0.00	7	0.00	-2.83	-0.00	.	-0.00	.

Trade-off between cumul. value of CFG/PIB (gov. budget in points of GDP) and PC (end-of-period consum. price). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* $\pm\sigma$	Rank order	*Trade-off* $\pm 2\sigma$	Rank order
TCSS	-4.25	1	....	-0.00	....	.	....	.
AG	0.04	4	0.16	0.27	-0.12	.	-0.28	.
TCSE	0.00	7	0.00	1.52	0.00	.	-0.00	.
TACP	0.00	8	0.00	1.83	0.00	.	-0.00	.
TAI	0.00	5	0.00	1.90	0.00	.	-0.00	.
XTM	0.31	3	4.39	0.07	-4.09	.	-8.48	.
XPSOCT	1.00	2	....	0.02	....	.	....	.
XIS	0.00	6	0.00	1.79	0.00	.	-0.00	.

Trade-off between cumul. value of CFX/PIB (trade bal. in points of GDP) and PC (end-of-period consumption price). *Trade-off* 1981-1984 ($\times 10^{-2}$)

	Trade -off	Rank order	Stand. error (σ)	*t-ratio*	*Trade-off* $\pm\sigma$	Rank order	*Trade-off* $\pm 2\sigma$	Rank order
TCSS	-2.84	1	....	-0.00	....	.	....	.
AG	0.04	4	0.15	0.28	-0.11	.	-0.26	.
TCSE	0.00	7	0.00	2.25	0.00	.	0.00	.
TACP	0.00	8	0.00	3.15	0.00	.	0.00	.
TAI	0.00	5	0.00	2.24	0.00	.	0.00	.
XTM	0.20	3	2.91	0.07	-2.71	.	-5.63	.
XPSOCT	0.66	2	...	0.02	....	.	....	.
XIS	0.00	6	0.00	2.40	0.00	.	0.00	

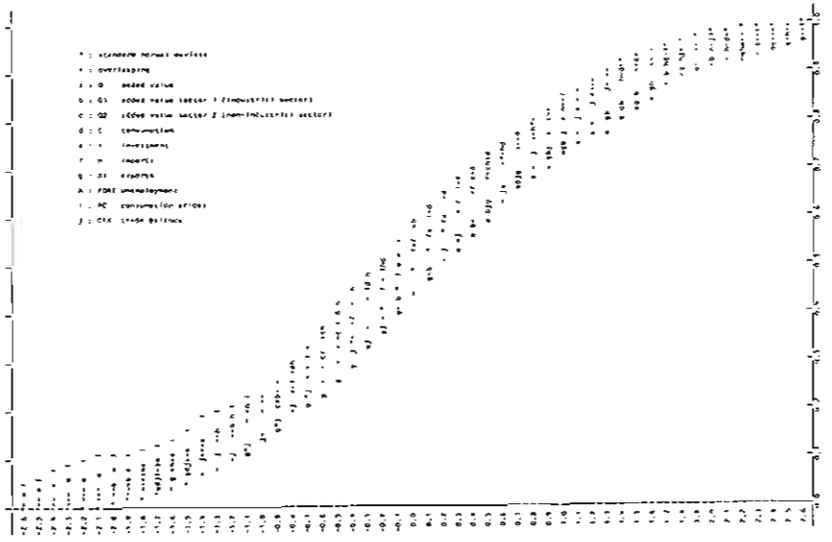
7. SMALL SAMPLE DISTRIBUTION OF TRADE-OFFS

A sampling experiment has been performed to evaluate how good are in the small sample case the asymptotic first order approximations derived in the previous sections.

We start from the model with a fixed set of parameters (in practice the coefficients and the error process covariance matrix obtained from estimating the model with historical data). We then generate vectors of pseudo-random error terms with the given covariance matrix (McCarthy, 1972) over the entire sample period and solve the model (stochastic simulation). The solution gives a matrix of pseudo-historical values of the endogenous variables which are used to re-estimate the structural coefficients of the model. Using this new estimate of the coefficients we compute the multipliers and the *trade-offs* $\tilde{\pi}_{ij}/\tilde{\pi}_{kj}$ for the target variables, for the instruments, and for the constraint variables previously considered.

All the process is repeated 500 times so that a sample of *trade-offs* $\tilde{\pi}_{ij}/\tilde{\pi}_{kj}$ is obtained for each set of targets, instruments and constraints of interest.

The first order approximation (asymptotically exact) derived in section 3, which led to the results in sections 5 and 6, can be considered acceptable if the experimentally generated values of $\tilde{\pi}_{ij}/\tilde{\pi}_{kj}$ are approximately distributed like a normal with mean equal to $\hat{\pi}_{ij}/\hat{\pi}_{kj}$ (the point estimates of the *trade-offs* appearing in the first column of each table) and standard deviation equal to those displayed in the third column of the tables. In other words, using $\hat{\pi}_{ij}/\hat{\pi}_{kj}$ and its asymptotic standard



Sampling distribution of standardized impact *trade-offs* (1981) between government budget CFG and the main targets. Instrument: TCSS.

Fig.2

error to standardize $\tilde{\pi}_{ij}/\tilde{\pi}_{kj}$, we should get a random variable close to a standard normal.

Most of the results appear as in figure 2, provided that we confine ourselves, among the variables of practical interest, to those cases in which the *trade-off* is significantly non-zero (a large *t-ratio* according to the asymptotic approximation).

Of course the situation is not the same if we consider also cases in which the denominator $\hat{\pi}_{kj}$ is affected by such a large degree of uncertainty as to be non-significantly different from zero. In these cases the first order (asymptotic) approximation is very poor, but at the same time the case would be of no practical interest for the risk averting policy maker.

8. CONCLUDING REMARKS

To summarize the comments on the tables, we can draw the following conclusions:

1) Most of the *trade-offs* have a significant sign, the main exception being between prices and activity using demand-side elements.
2) But only for statistics associating government or trade balances with other variables does this sign mean that we have to loose in terms of one variable to improve the other.
3) The results are quite similar if we consider the balances in current terms or in points of GDP.
4) As to prices or unemployment, they improve with the other variables; thus we get less interesting results.
5) Supply-side instruments seem more efficient on average even in the short term (especially in terms of government budget), but their greater uncertainty makes the situation less clear if we consider guaranteed values. With time the hierarchy becomes less clear, especially when government budget is concerned.
6) Accordingly, the *trade-offs* associated with the industrial product loose precision with time, while for the non-industrial they keep globally the same value.
7) In the short term the *trade-offs* associated with government budget appear less precise than for trade balance. But the situation changes with time, as government budget *trade-offs* see their precision

increase, while precision decreases for the other. The main reason is the uncertainty on the initial inertia of some important variables, like employment, investment, household consumption, the link between revenue and demand, and the growing contrary effects of tensions and inflation on the link between demand and trade balance.

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