We can prove (see (E1) in appendix) that

$-1 / (2 P_{1b} - 1) \leq -[(1 - P_{3b})^2 P_{1b} - P_{3b}^2 (1 - P_{1b})] / (P_{1b} - P_{3b})^2$

and that $[(1 - P_{3b})^2 P_{1b} - P_{3b}^2 (1 - P_{1b})]$ can only be positive (see (E2) in appendix).

So (19) ≤ (20).

Therefore the maximum value of E(U-u), with two agents in electoral period, is (20).

4. Contract with two agents in the non-electoral period.

As we have already said, in the non-electoral period the politician will prefer stability in the banking system and price stability. Therefore, in this period the politician's utility expected net value will be:

$$(21)\ E(U\text{-}u) = [G (1 + R) - u(T_b) - u(T_p)] P_{2b} P_{1p} + [G - u(T_b) - u(t_p)] P_{2b} (1 - P_{1p}) +$$
$$+ [g (1 + r) - u(t_b) - u(T_p)] (1 - P_{2b}) P_{2p} + [g - u(t_b) - u(t_p)] (1 - P_{2b}) (1 - P_{2p}) =$$
$$= H' - u(T_b) P_{2b} - u(t_b) (1 - P_{2b}) - u(T_p) B - u(t_p) (1 - B)$$

where

$$(22)\ H' = G P_{2b} (1 + R P_{1p}) + g (1 - P_{2b}) (1 + r P_{2p})$$

BA's incentive and participation constraint is that they are

$$(23)\ E(I_b \mid e_b = 1) \geq E(I_b \mid e_b = 0)$$

$$(24)\ E(I_b \mid e_b = 1) \geq 0.$$

Likewise the incentive and participation constraints for CB will be

$$(25)\ E(I_p \mid e_p = 1) \geq E(I_p \mid e_p = 0)$$

$$(26)\ E(I_p \mid e_p = 1) \geq 0.$$ [21]

As in the previous section, the various cases that can eventuate need to be analysed. This analysis reveals that the possible solutions to the problem of optimization are the following[22]:

[21] See appendix B.) for the solution to the problem of constrained optimization.

[22] Other solutions, which result by the first-order conditions, are the following :

iii) $t_b = T_b = 0$ if $P_{0b} = P_{2b}$

iv) $t_b = -C_b P_{0b} / (P_{2b} - P_{0b})$, $T_b = C_b (1 - P_{0b}) / (P_{2b} - P_{0b})$ if $P_{0b} \leq 1/2$

v) $t_p = -A C_p / (B - A)$, $T_p = (1 - A) C_p / (B - A)$ if $A \leq 1/2$

i) $t_b = -T_b$ with $T_b = C_b / (2 P_{2b} - 1)$ if $P_{0b} \leq 1/2 < P_{2b}$

(27)

ii) $t_p = -C_p / (2 B - 1)$, $T_p = -t_p$ if $A \leq 1/2 < B$

These solutions derive from the hypothesis made that when the two agents make an effort, they expect a benefit large enough to cover the cost incurred to achieve the goal. If on the other hand they make no effort they will be punished by the politician. The punishment is the politician's reward to the agents when they reach a bad performance. In this case, therefore, the agents obtain a negative expected benefit.

Keeping in mind that the politician's expected utility function in the non-electoral period is:

(28) $E(U - u) = H' - u(T_b) P_{2b} - u(t_b) (1 - P_{2b}) - u(T_p) B - u(t_p) (1 - B)$

If we substitute the incentive payments in the politician's utility function E(U – u), as we did in the previous case, we obtain

(29) $\mathbf{E(U - u) = H' - (1/2) \{[C_b^2 / (2 P_{2b} - 1)] + [C_p^2 / (2 B - 1)]\}}$

5. **Contract with a single agent in the electoral period.**

Let us now consider the case where both the functions are delegated to a single authority, the central bank. To see whether this situation is advantageous for the politician, we have to calculate the expected utility and compare it with the expected utility with two separate authorities.

We suppose that the politician will offer four different incentive payments to the CB, according to whether four different events take place. In particular, the politician will give to the agent

T_{10}	if	$E_1 = Bs \cap -Ps$
T_{11}	"	$E_2 = Bs \cap Ps$
T_{01}	"	$E_3 = -Bs \cap Ps$
T_{00}	"	$E_4 = -Bs \cap -Ps$

However, these solutions, which are not very interesting from an economic point of view, will be disregarded; only i) will be considered. This does not change the results.