

Answer to the comments of Referee 1

First, I would like to thank the referee for the attention that he has paid to the reading of my paper, and for his comments. Here are then my answers to these comments:

-New Keynesian models do not always introduce lags in the transmission mechanisms of monetary policy. However, the advantage of a dynamic model like the one that I have used in this paper is to be able to take into account the fact that the effects of economic policies are not immediate. The consequences of an increase in budgetary expenditures on the economic activity level are quite fast: they quickly increase the global demand (independently of the time needed to take and to implement decisions). On the contrary, even if a decrease in interest rates would lead to an increase in economic activity, this transmission can take some time. Economic agents must realize that the returns on their sparing have been reduced, and then decide to adjust their behaviors. They will consume more and spare less, but this adjustment is not instantaneous. That is why I have considered a lag of one period in the transmission mechanism of monetary policy. In the new version of my paper, I have specified this point in footnote 1. However, considering that this lag is negligible and using a more static model would also have been possible...

-I recognize that my theoretical model is very heavy to solve analytically. That is why I mention in footnote 2 that the theoretical derivations of my results are only available upon request, and are not mentioned in the paper. In order to derive the optimal interest rate in (5), I use: $dL^M/di_t = 0$, which implies: $2\xi^M(i_t - i_{t-1}) + 2\delta\gamma^M[E_t(y_{t+1}) - y^*]m_{y_t, i_t - 1} + 2\delta\xi^M i_t = 0$.

According to the value of (y_{t+1}) mentioned in Appendix A, I can then obtain an optimal interest rate which depends on the activity target (y^*) , on the former interest rate (i_{t-1}) , on the former inflation rates and activity levels $(y_{t-1}, \bar{y}_{t-1}, \pi_{t-1}, \bar{\pi}_{t-1})$, on budgetary policies $(g_t$ and $\bar{g}_t)$, and on the supply and demand shocks $(d_t, \bar{d}_t, s_t, \bar{s}_t)$. On the website of *Economics E-Journal*, "data set, additional material", I have detailed the derivation of all my theoretical results.

I agree that the monetary reaction function in equation (5) is much more complex than a kind of Taylor rule. But this optimal interest rate is the one which can be derived analytically from the basic equations and loss functions of my model.

-On p.7, in the new version of my paper, I have clarified that the symmetric component of a shock is the average value of this shock in the monetary union, that is to say the weighted average of the shock between the two groups of countries. A symmetric shock would have the same consequences on economic activity levels and inflation rates in both groups of countries. On the contrary, the asymmetric component of a shock is the differential between the specific values of this shock in each group of countries, that is to say the part of a shock affecting in opposite ways the two groups. For example, if a specific demand shock affects the member countries of the monetary union, it would have an asymmetric component if it is a positive demand shock with expansionary consequences for one group of countries but a negative demand shock with recessive consequences for the other group.

Therefore, we have: $x_{t(p)} = n(x_t + \bar{x}_t) / (2n_p)$ and $x_{t(k)} = n(x_t - \bar{x}_t) / (2n_k)$, as the shocks in to each group of countries are the sum of their symmetric (average value in the monetary union) and asymmetric (with opposite consequences in each group of countries) components.

-In case of symmetric demand shocks, budgetary cooperation would be beneficial. But the results of my model are more complex. I show that it would be beneficial only if budgetary multipliers and openness to trade are sufficiently high for the cooperating countries. The

contribution of my paper is precisely to underline the importance of the structural heterogeneity between the member countries of the monetary union. In the same way, in case of symmetric supply shocks, budgetary cooperation is only beneficial between a sufficiently large number of countries, whereas it is detrimental between a small number of countries.

In case of asymmetric demand or supply shocks, budgetary cooperation is detrimental between countries with budgetary multipliers or openness to trade which are too different from those of the other member countries of the monetary union. However, it would be beneficial in a more structurally homogeneous monetary union. A partial budgetary cooperation is beneficial only between a limited number of countries in case of asymmetric demand shocks, but on the contrary, it must concern a sufficiently large number of countries in case of asymmetric supply shocks. Therefore, my results are quite detailed regarding the importance of the structural heterogeneity between the cooperating countries!

Therefore, my results show that budgetary cooperation should be encouraged only in specific conditions regarding the structural parameters of the member countries of the monetary union; these conditions depend on the nature of the shocks to be stabilized.

The figures illustrate the stabilization of economic activity levels according to the structural heterogeneity between the member countries of the monetary union, and thus the huge dependence of my results on this heterogeneity. Budgetary cooperation is not equally beneficial or detrimental whatever the structural heterogeneity between the countries! The figures as well as my comments insist on this important and quite new result. In the new version of my paper, I have added the references to the figures in the text, which were missing in the previous version, as mentioned by the referee.

-Indeed, my model is very complex analytically, and the equations are not easy to derive. But I think that these complex equations allow deriving interesting results about the importance of structural heterogeneity between the member countries of a monetary union for the usefulness of the budgetary cooperation. With a more standard monetary policy reaction function for example, I think that I would not have been able to derive the interesting and relatively clear-cut theoretical results for the stabilization of demand or supply shocks mentioned in sections 5 and 6.

The details of the calculations are only available upon request. In equations (6), (8) and (9) mentioned in section 4., I have only let the details of the derivatives for the demand and supply shocks, which are necessary for my comments in sections 5 and 6.

I have written: $+f(\pi_{t-1}, \bar{\pi}_{t-1}, y_{t-1}, \bar{y}_{t-1}, i_{t-1}, g^*, y^*)$ in these equations in section 4., in order precisely not to mention what was not necessary and useful for the analysis of the stabilization of demand or supply shocks, which was the aim of the paper.