

Policy changes in the Luxembourg labour and product markets A Simulation with the LSM Model

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Current crisis:

- Heavy consequences on workers in terms of higher unemployment and lower income and wealth.
- Firms negatively affected: decrease in demand and increase in financial costs.
- Will influence their hiring and investment prospects.
- Call on the government to intervene directly in the economy.
 - To sustain aggregate demand
 - To implement other policy changes: alleviate the negative impact of the crisis in the labour and product markets.

Objective:

- To evaluate the expected consequences of a set of policy measures generally considered as good candidates to improve the workers' and firms' conditions
- New context:
 - Emergency actions (bank default, credit crunch, billions of liquidity injected).
 - Easiness to mobilize billions for the private sector has suggested that a profound shift of attitude had taken place.
 - Governments ready to shift away from the more liberal positioning of the late 90s.
 - Public interventions to salvage industries: US federal state producing SUVs, general shift away from internal market rules in the EU.
- New atmosphere surrounding public policies might shape policies recommendations in an unusual way.
- This paper aims at examining potentially proposed policies in a consistent macroeconomic framework.

How to model such policies?

- Intricate given the degree of imagination of policy makers.
- Example: direct support to industry or protection of domestic market.
- Shortcut: model the actual impact of such policies which aim basically at reducing competitive pressures and accordingly restore markups.
- A policy to be simulated is accordingly **an increase of 1% in the mark-up** charged by firms.
- Mirroring measures to protect the firms and increase their profits and hence investment and hiring possibilities.
- Such policies directly targeted towards firms may not suffice however, given the sharp drop in the activity.
- Hence the need to directly address the unemployment issue, and to alleviate the impact of increasing unemployment on final demand.

- Other policies simulated.
- An **increase of 1% in the replacement rate**, which could be helpful to sustain the income and consumption of workers that lose their job.
- Might be even more efficient to directly subsidize private employment. A **decrease of 1% in social contributions** is an alternative measure to alleviate the firms' conditions by lowering their costs (also a one-shot increase in competitiveness, comparable to a real depreciation).
- Support final demand by increasing disposable income of households.
 - A **decrease of 1% in labour taxes**, a policy that would increase the available income for workers and unemployed persons.
 - A **decrease of 1% in consumption (VAT) taxes**, lowering the price of consumption goods.

- The **timing dimension of policies is important.**
 - Sharp measures adopted for a limited period of time might be preferred to permanent measures, given the short run nature of the crisis.
 - For each policy measure we consider both a permanent implementation, and a temporary implementation that lasts 2 years only.
- **Optimal combination of available policy instruments** to be examined.
 - Due to the complex structure of the economy, it might be that more than one policy is required to achieve the desired results.
 - One policy might smooth the undesirable effects of another.
 - But policies might also neutralize them each other.
 - We will tentatively combine the policies.

- The assessment of the consequences of these policies is **based on the new Luxembourg Structural Model (LSM)**
- Incorporates the most recent advances in economic theory.
- LSM combines these advances with a careful modelling of the particular institutional features of Luxembourg:
 - Dual labour market characterized by a large share of non-resident workers.
 - Importance of the union-firm relationships.
- For each of the mentioned policy measures, we focus on the effects on a set of key variables. We compute changes:
 - In the per-capita wages of resident and non-resident workers.
 - In employment of resident and non-resident workers.
 - In the total wage bill for resident and non-resident workers.
 - In overall firms' profits.
 - In the private demand components.
 - In the overall GDP.
 - In government deficit.
 - In total factor productivity.

What is LSM?

- LSM: Luxembourg Structural Model.
- A Dynamic Stochastic General Equilibrium (DSGE) model.
 - Dynamic: considers also dynamic adjustment of the economy to shocks or policy changes.
 - Stochastic: allows also for random shocks hitting the economy (technological change, oil shock, macroeconomic policies, etc.)
 - General Equilibrium: model all markets and agents jointly, and model agents' reactions to structural policy changes.
- Price to be paid for consistence: a schematic and simplified representation of the Luxembourg economy (e.g. no sectoral disaggregation).
- New generation of models used mainly in central banks.
- LSM: Open economy version of 'ModEL'.

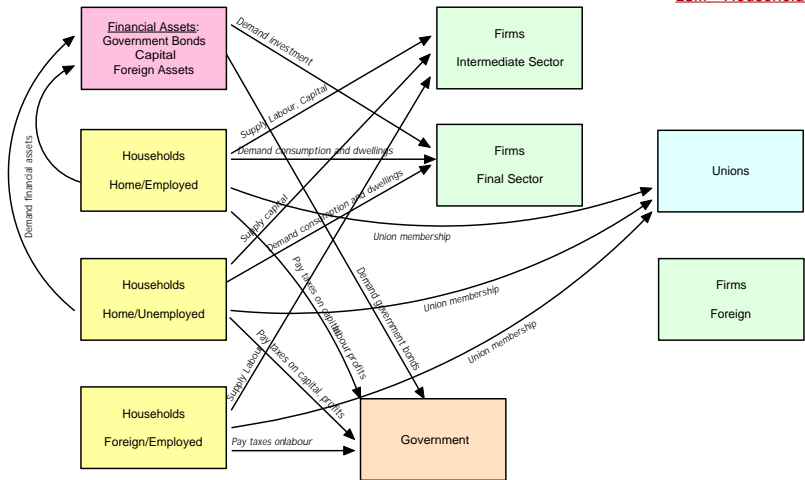
The structure of LSM: Households

- Four types of agents: Households, Government, Firms and Unions.
- Households have finite lives.
- Each household maximizes an intertemporal utility function s.t. budget constraint.
- Optimal amount of consumption, dwellings and assets.
- Individual Households' decisions aggregated to determine aggregate demand of consumption, dwellings and assets.
- Assets include property rights on capital.
- Households supply not only labour but also capital to Firms.
- Can be tentatively represented in a chart.

Households (cont.)

- Households supply labour.
- Unions are in charge of the wage bargaining with the Firms.
- Unemployed workers receive benefits.
- Two segments of the labour market: residents non-residents.
- Households pay taxes on wages from labour, rents from capital, and profits.
- Let's start with left-hand side panel, second cell from top.

LSM - Households



The structure of LSM: Government

- Government collects taxes on the returns from assets and on labour income, profits, imports and exports.
- Also collects social contributions and possibly value added taxes.
- Tax receipts used to finance expenditures:
 - Unemployment benefits.
 - Other transfers to residents and non-residents.
 - Public investment (productive expenditure that affects TFP).
 - Possible deficit (surplus), whose evolution over time, combined with that of interest rates, determines level of public debt.
 - Government debt financed with emission of public bonds.
- Government also sets relevant policy variables:
 - Replacement rate.
 - Union power.
 - Degree of competition.
 - Degree of openness of the economy.

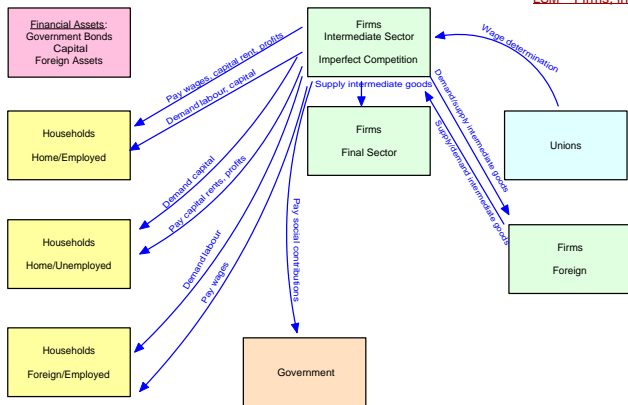
The structure of LSM: Intermediate producers

- Production sector: *intermediate* and final goods.
- In the (differentiated) intermediate goods sector Firms operate under *monopolistic competition*.
- Production function combines capital and two different types of labour as inputs (resident and non-resident, possibly with different productivity).
- Public investment (productive public expenditure) increases productivity.
- Exogenous technical progress increases productivity.
- Some Firms are "importers": buy intermediate goods abroad and resell them internally (mark-up).

The structure of LSM: Unions

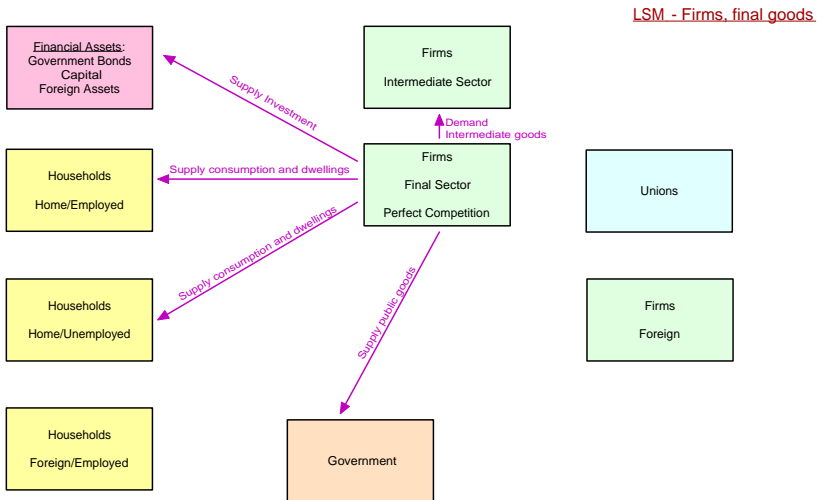
- Unions represent workers.
- Wages are determined by interaction between the (intermediate goods) Firms and the Unions.
- Firms and unions bargain separately in the tradable and non-tradable sectors.
- Given resulting wages, labour demand is determined.
- Technically:
 - Interaction between the production and labour markets is represented as a game in two stages.
 - Wage bargaining takes place in the first stage.
 - Production in the second.
- Role of intermediate Firms and of Unions summarised as follows.

LSM - Firms, intermediate goods, and Unions



The structure of LSM: Final producers

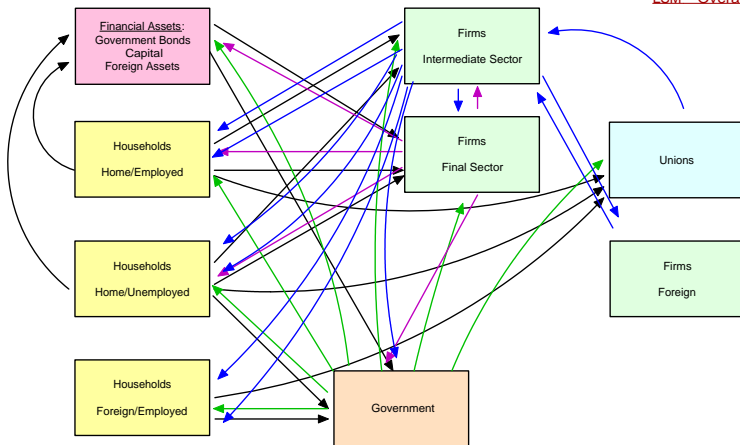
- Production sector: intermediate and *final* goods.
- Final goods sector:
 - Firms operate under *perfect* competition.
 - Production function with a *variety of intermediate goods* only as inputs.
 - Possibly with increasing returns to variety.
- Maximize profits s.t. production function constraint.
- Determines their demand of intermediate goods (supplied by Firms in the intermediate goods sector).
- Supply of final good (that can be differentiated at no cost) matches aggregate demand from Households and Government.
- Role of the Firms in final goods sector summarized as follows.



The structure of LSM: Assets

- Interest rate exogenous (small open economy assumption).
- Plus a debt-elastic interest-rate premium (increasing in the country's net foreign debt).
- Exchange rate is also exogenous as long as prices are fixed.
- Three types of assets are perfect substitutes in the household's portfolio, and earn the same (exogenous) real rate of return.
 - Government bonds.
 - Foreign assets.
 - Claims to physical capital.
- Overall set of relations in LSM is messy: this is where a model is worthwhile.

LSM - Overall structure



Experiment 1: Higher replacement rate

- Since the crisis will likely increase the unemployment rate, a possible measure to attenuate the income loss of the job losers is to increase the replacement rate of the resident workers.
- An increase of 1% in the replacement rate.
- Such policy would *a priori* combine many advantages:
 - It would facilitate transitory adjustments, by reducing the negative impact of firms' adjustment on the labour market.
 - It would inject purchasing power in the economy, and target such transfer to households potentially highly constrained.
 - All in all, such policy would alleviate the adjustment cost and sustain consumption and thus economic activity.
- We hereafter detail the impacts of such policy.

We focus on the changes in each variable with respect to its starting value. We use +, ++ and +++ to denote an increase in the range of, respectively: 0-0.5%, 0.5-1% or larger than 1%. The symbols -, --, and --- have a similar interpretation for negative changes.

+1% replacement rate (permanent)

Variable	1y	2y	5y	10y
GDP	--	--	--	--
Consumption	--	--	--	--
Investment	-	-	--	--
Net exports - intermediate goods	+++	+++	+++	+++
Government deficit	+++	+++	+++	+++
Employment, resident	---	---	---	---
Employment, non resident	+	+	+	+
Profits	--	--	--	--
Wages, resident	++	++	++	++
Wages, non resident	-	-	-	--
Total wages, resident	--	--	--	--
Total wages, non resident	-	-	-	-
Total Factor Productivity	-	-	-	-

Explanation: a change in the relative cost of labour

- As expected positive income effect for the unemployed.
- Unexpected positive effect on the wage of the resident workers that are still employed.
- As the outside option for workers improves, their wage has also to increase.
- Since the replacement rate for the non-resident workers remains fixed, their outside option worsens when compared with that of the resident workers.
- Hence, the wage of the non-resident workers does not increase, actually it can slightly decrease.
- Makes the resident workers more costly for the firms than the non-resident workers.

Explanation: impact on the labour market

- Firms are expected to react by reducing the employment of the resident workers and increasing that of the non-resident workers.
- Will indeed partially offset the positive impact of this policy.
- In total, we have higher wages *but* lower employment for resident workers, with the latter effect dominating the former, so that the total resident wage bill actually *decreases*.
- Instead, we have slightly lower wages for non-resident workers with higher employment, but in this case the wage effects dominates the employment effect, and the non-resident wage bill decreases.

Explanation: impact on income and activity

- Lower *total* wages for resident workers imply lower available income, rather than higher as hoped.
- Consumption ultimately *decreases*.
- Shrinks the firms' profits, which in turns reduces investment, which further reduces demand and gross domestic product (GDP).
- The only positive effects is on net trade, since lower consumption decreases imports.
- The higher replacement rate combined with lower employment makes public expenditures for unemployment benefits increase.
- Tax receipts decrease due to lower wages, profits and consumption.
- Induced compression in government investment (infrastructure, but also R & D, education, etc.); negative impact on the evolution of total factor productivity.

- The replacement rate can be reduced by the same amount (1%) *but for two years only*.
- Temporary policy instead of permanent policy
- Qualitatively the effects are similar over the first two years.
- There are some changes after two years, once the policy is no longer in place.
- In particular:
 - Wages of the resident workers now *decrease*.
 - Employment is reduced less.
 - Overall the total wage bill still decreases.
 - Consumption and GDP decrease, though to a lesser extent than in the permanent policy change.

+1% replacement rate (temporary)

Variable	1y	2y	5y	10y
GDP	--	--	-	-
Consumption	-	-	-	-
Investment	-	-	-	-
Net exports - intermediate goods	+++	+++	+	+
Government deficit	+++	+++	---	---
Employment, resident	---	---	+	-
Employment, non resident	+	+	-	-
Profits	--	--	-	-
Wages, resident	++	++	-	-
Wages, non resident	-	-	-	-
Total wages, resident	--	--	-	-
Total wages, non resident	-	-	-	-
Total Factor Productivity	-	-	-	-

Due to the specific patterns of the labour market a policy aiming at alleviating the cost of firms' adjustments on the labour market has ultimately further worsened the situation.

Discussion

- The magnitude of the reaction of the economy is indeed driven by the calibration of the model.
- Still, the model is very useful to understand the potential problem with this policy.
- This policy leads to an increase in the wages of the employees associated with the higher unemployment benefits.

Potential solutions:

- To cushion the link between higher benefits and higher wages.
- A higher replacement rate associated with tighter conditions or a limited duration ("flexsecurity").
- Would still be necessary to find a compensation for the higher government expenditure.
- Higher taxes could depress income (or profits and investment).
- The ideal solution would be a reduction in non-productive government consumption.
- The government should accept to improve its structural budget balance, while worsening the transitory component of it.
- Governments have actually generally chosen a different route:
 - Instead of paying for unemployment benefits
 - Better treat the problem of demand deficit by:
 - Injecting additional public expenses.
 - Reducing competition on the product and services markets.
 - To alleviate the difficulties of the firms.

Experiment 2: An increase in the mark-ups

- An increase in the monopolistic power mimicking a reduction in the level of competition in the goods market.
- This allows the firms to apply a higher mark-up on their costs.
- To make higher profits (to secure profits in an adverse environment).
- However, the situation is more complex than what the common sense would suggest.
- One important reason for this is that *costs also depend on sales*.
- Increasing or better resisting to price reductions will have an adverse effect on sales.
- Will ultimately increase unit costs and reduce employment.

- If the sales decrease too much, higher prices are not sufficient to guarantee higher profits.
- The volume effect is large.
- Lower production requires fewer workers, so that employment decreases.
- The total wage bill is reduced, as well as income and therefore consumption.
- Lower profits leads to lower investment, which brings about an additional reduction in private demand.
- Higher prices translate into lower real wages for (both resident and non-resident) workers.
- Lower wages, employment, profits and consumption imply lower tax receipts.
- a.w.a. higher expenditures in unemployment benefits.

- The results of a temporary rather than permanent increase in the mark-up are qualitatively similar, though smaller in size.
- In particular, there remain negative consequences on wages, employment, profits, consumption and investment.
- This is in addition a non-cooperative policy.
- Fully taking into account the consequences of a de facto coordination of governments of different European countries on this non cooperative equilibrium would be even more damaging, as a result of a further decrease in foreign demand.

+1% mark-up (permanent)

Variable	1y	2y	5y	10y
GDP	-	-	-	-
Consumption	--	--	--	--
Investment	-	-	-	-
Net exports - intermediate goods	+++	+++	+++	+++
Government deficit	+++	+++	+++	+++
Employment, resident	-	-	-	-
Employment, non resident	-	-	-	-
Profits	-	-	-	-
Wages, resident	-	-	-	-
Wages, non resident	-	-	-	-
Total wages, resident	-	-	-	-
Total wages, non resident	-	-	-	-
Total Factor Productivity	-	-	-	-

Experiment 3: Lower social contributions

- Due to the unions-firm bargaining, part of the decrease in social contributions is translated into higher wages (for both resident and non-resident workers).
- Still, due to the lower costs, firms are willing to hire more workers, which increases employment.
- Such combination of higher wages and higher employment increases the total wage bill.
- This increases income and consumption.

- The higher demand matches the higher production of the firms.
- Higher demand translates into higher profits.
- Higher investment.
- Higher wages, profits and consumption lead to more tax receipts, while higher employment requires less unemployment benefits.
- Therefore, the public budget improves.
- Additional public resources can be allocated to government investment, which makes total factor productivity increase, planting the seeds for additional future growth.

-1% social contributions (permanent)

Variable	1y	2y	5y	10y
GDP	+	+	+	+
Consumption	+	+	+	+
Investment	+	+	+	+
Net exports - intermediate goods	-	-	-	-
Government deficit	---	---	---	---
Employment, resident	+	+	+	+
Employment, non resident	+	+	+	+
Profits	+	+	+	+
Wages, resident	+	+	+	+
Wages, non resident	+	+	+	+
Total wages, resident	+	+	+	+
Total wages, non resident	+	+	+	+
Total Factor Productivity	+	+	+	+

Experiment 4: Lower taxes on labour

- A permanent decrease of 1% in the average tax rate on labour income.
- The ultimate impact of this policy is less appealing than expected.
 - A decrease in gross wages.
 - An increase in employment.
 - An overall decrease in the total gross wage bill.
 - An increase in the net (after tax) wage bill due to the lower average tax rate.
 - However, in practice all these effects are very small and close to zero.
 - The only noticeable effects are on consumption.
 - And on the government deficit, which increases due to lower receipts.

Discussion

- The overall deceiving effects of a decrease in labour taxes are due to four main factors.
 - A large fraction of workers are non-resident, expected to spend their higher net income in their home country.
 - In LSM (Maastricht criteria or impossibility of permanently increasing deficit) a decrease in tax receipts generates a close to matching decrease in government spending.
 - Third, there is a single tax rate in the model, while allowing for differentiated and progressive tax rates and lowering only those associated with low incomes could enhance the effects of the policy.
 - Fourth, lower labour taxes could increase the participation rate, i.e., the size of the labour force, while this effect is not present in LSM.
 - But the latter effect by itself would not be sufficient to increase in the employment rate if labour cost is not reduced.

-1% labour taxes (permanent)

Variable	1y	2y	5y	10y
GDP	-	-	-	-
Consumption	+	+	+	+
Investment	-	-	-	-
Net exports - intermediate goods	+	+	+	+
Government deficit	+++	+++	+++	+++
Employment, resident	+	+	+	+
Employment, non resident	+	+	+	+
Profits	-	-	-	-
Wages, resident	-	-	-	-
Wages, non resident	-	-	-	-
Total wages, resident	-	-	-	-
Total wages, non resident	-	-	-	-
Total Factor Productivity	-	-	-	-

Experiment 5: Lower taxes on consumption

- Subsidize consumption by reducing indirect taxes.
- One can expect that such policy would sustain activity and employment.
- We lower consumption (VAT) taxes by 1%.
- The overall effects of this policy measure are close to zero in terms of wages and employment.
- There is a consistent increase in consumption, but at the cost of a reduction in dwellings, because of the resulting differentials in tax rates.

Combining policies

- The previous results suggest to consider:
 - A *joint change* in the replacement rate and in the mark-up.
 - Or a *joint change* in the replacement rate and in social contributions.
 - Or a *joint change* in the three variables together.
- In order to influence at the same time both the labour and the product markets.
- We now summarise the results of the best combination, which is the latter.

Combining 3 policies

- We simulate a **lower replacement rate**.
- Accompanied by **lower mark-up** to compensate the workers with lower goods prices in exchange for more competition in the labour market.
- And by **lower social contributions**, to compensate the firms for more competition in the goods market.
- Permanent 1% drop in all the three variables.

3 policies combined (permanent)

Variable	1y	2y	5y	10y
GDP	+++	+++	+++	+++
Consumption	+++	+++	+++	+++
Investment	++	++	+++	+++
Net exports - intermediate goods	---	---	---	---
Government deficit	---	---	---	---
Employment, resident	+++	+++	+++	+++
Employment, non resident	+	+	+	++
Profits	+++	+++	+++	+++
Wages, resident	-	+	+	+
Wages, non resident	+++	+++	+++	+++
Total wages, resident	+++	+++	+++	+++
Total wages, non resident	+++	+++	+++	+++
Total Factor Productivity	+	+	+	+

- The decrease in the per-capita wages of resident workers is really small, -0.05% .
- With an increase already in the second year after the policy is implemented.
- The wages of the non-resident workers increase.
- But higher wages does *not* prevent higher employment.
- As a consequence, there is also a substantial and lasting increase in the total wage bill.
- The higher wage bill translates into higher consumption (more than with any of the other policies under investigation).
- Higher demand stimulates production.
- Additional production requires not only more workers but also more capital, and therefore more investment, which in turn further increases demand and production.
- Lower public expenditures and higher tax revenues, large enough to compensate for the effects of lower social contributions.

Conclusion:

- What we can draw from this exercise is twofold.
- First, **too simplistic policies aiming at protecting workers or firms may be counterproductive.**
 - For instance, we showed that an increase in the replacement rate would reduce employment.
 - We would have higher wages but lower employment for resident workers, with the latter effect dominating the former.
 - Lower total wages for resident workers would translate into lower available income, so that consumption would ultimately decrease.
- In the same way, we have shown that policies aiming at protecting domestic firms from competition would hardly reach their objective.

- We have illustrated that **a combination of policies would have two advantages: technical and political.**
- Technical: a given policy can offset the adverse effect of another economic policy on a given variable.
- Political: it is important to share the burden of adjustments between employers and employees.
- Such well balanced policies are the only ones to ultimately achieve their goals.
- There are also the only ones to be accepted in a difficult economic context adversely affecting firms, employees and public budgets.
- **Beyond the technicalities of the simulation, this exercise accordingly calls for carefully negotiated policy measures – between employees, employers and government – based on sound economic reasoning.**

Thank you