

# Discussion of “Altruism, Incomplete Markets and Tax Reform” by Fuster, İmrohorođlu and İmrohorođlu by Árpád Ábrahám<sup>1</sup>

## 1 Introduction

It is an honor to discuss this interesting and important paper. The paper answers a set of important policy question taking a plausible description of the U.S. tax system as a point of departure:

- Is it a good idea to eliminate capital income taxation?
- If yes, shall we replace the lost revenue by increasing labor or consumption taxes?
- How big are the implied welfare gains of different tax reforms in the long run?
- Which tax reform has political support?

These are key questions in recent policy discussions, and as I will discuss below there is no consensus among economists what are the right answers. One of the main contributions of the paper by Fuster et. al is that it brings a new model into this literature. The literature so far studied the issue of tax reform using either pure life-cycle models or economies with infinitely lived agents. The main model (the dynastic set-up) of this paper is a new and empirically plausible blend of these two approaches. The set-up was already used by the authors in Fuster et. al (2006) to study the feasibility of social security reform.

In the model economy, the population consists of overlapping generations, where agents face stochastic earnings and survival shocks and they made savings and labor supply decisions along their life-cycle. The key assumption that makes this model different from typical life-cycle economies is that parents and offsprings are connected through mutual altruism. The form of altruism is somewhat extreme; parents and offsprings make all their economic decisions as a unit, therefore all shocks within the dynasty are fully insured. In particular, not only parents are able to insure their offsprings by bequeathing wealth and through intervivos transfers, but also offsprings are able to compensate parents for short-run losses through intervivos transfers. The paper shows that the availability of these intergenerational transfers can be a key factor to understand whether a particular tax reform can gain political support or not.

The conclusions regarding the desirability of the tax reform are interestingly different from both the predictions of the pure life-cycle model (studied in the

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<sup>1</sup>*Correspondence:* Department of Economics, University of Rochester, Harkness Hall, P.O.Box 270156, Rochester NY 14627. *E-mail:* aabraha2@mail.rochester.edu.

paper) and of the conclusions of a similar exercise executed in a model with infinitely lived agents (Domeij and Heathcote, 2004).

My discussion is organized as follows. First, I briefly describe and compare the main elements of the two models of the paper. Then, I evaluate the results by comparing them to the literature on capital taxation in pure life-cycle and infinitely lived agent economies. I conclude by suggesting some future directions of research utilizing the rich and complex structure of the model.

## 2 Summary

**Environment** In the model economies, individuals live for an uncertain but finite number of periods. They work between age 25 and 65 and retire afterwards. The first component of their labor market productivity is ability which is permanent and also determines the age-productivity profile. Their labor productivity is also hit by idiosyncratic shocks which an ability-dependent Markov process. The survival probabilities are also a function of ability. Markets are assumed to be incomplete, that is agents can only use savings in a risk-free bond to insure against productivity and survival shocks. Insurance markets are neither available for earnings uncertainty nor for mortality risk.

The production side is modelled in a standard way by a representative firm who operates a Cobb-Douglas production technology with no aggregate uncertainty. Agents' saving decision and labor supply decision will determine the aggregate supply of capital and labour, respectively. There is constant population growth and no productivity growth.

Fiscal policy is modelled in a great detail. The government is running balanced budget period-by-period and it has to finance government expenditure which is a constant fraction of output over time. It raises revenue from proportional capital, labor and consumption taxation. In addition to this, there is a realistic pay-as-you-go social security system financed by payroll taxes. Similarly to the U.S. social security system, pensions depend on average lifetime earnings in a progressive way.<sup>2</sup>

The dynastic model is imposing a family (dynasty) structure on this environment. Households are formed by a parent who is between 55 and 90 years old and 1.52 (because of population growth) offsprings who are between 20 and 55. Parents and offsprings discount their own next period utility and their offspring's next period utility at the same rate. Moreover, there are no bargaining, commitment or informational frictions within the household. These properties imply that within the household, pooled resources are allocated efficiently in terms of consumption, savings and labor supply. This implies that transitional income shocks are perfectly insured within the household. Obviously, there is still considerable income uncertainty at the household level, which is not insurable. This household structure provides some insurance against income shocks but at the same time it introduces new dimensions of uncertainty. First, households have

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<sup>2</sup>In the pure life-cycle model, the government also collects and redistributes accidental bequests.

different structures: there are complete households, other ones without living parents, and there are also households where offsprings are not alive. Finally, although ability is assumed to be correlated across different generations within the same dynasty, still there is considerable uncertainty regarding the earning potential of future offsprings.

This model is quite complex in the benchmark dynastic model, there are 9 state variables:

- (Potential) age of the offsprings (the age of the parent is determined by the age of the offsprings).
- Type of the household (parent-children, only children, only parent).
- Ability levels for both parent and children.
- Idiosyncratic productivity for both parents and children.
- Household's asset level.
- Up-to-date life-time earnings for both parents and children. (They are needed for the determination of future or current pensions payments.)

Although, apart from the asset level and life-time earnings, the above variables are naturally discrete or approximated by a discrete process, this model imposes a considerable computational burden. On the other hand, it has attractive features which can probably go far beyond the current application: it utilizes the fact that, in the presence of altruism, there are important insurance opportunities across generations within a household. These intergenerational links serve as a source of insurance and can serve as a compensation instrument when policies have different impact across generations. Second, this model introduces some new sources of uncertainty individuals face in the real world into the incomplete market heterogeneous agent framework. As I will discuss later, these features of the model may raise further empirical or quantitative questions and could be very appealing for further applications.

**Results** The main results of the paper are quantitative in nature. First of all, in the benchmark model, the reform which has the highest long-run welfare gain is the one where all income taxes are eliminated and replaced by consumption taxes.<sup>3</sup> In this case, there is a significant capital accumulation effect (41.5%) which is not accompanied by a significant change in labor supply, hence wages increase significantly. The considerable reduction in the (pre-tax) interest rate and the modest increase in the effective labor tax rate implies that eventually, the after tax interest rate remains constant while after tax wages increase. All

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<sup>3</sup>In Table 2, the authors also consider a reform where social security and capital income taxation are eliminated together at the cost of higher consumption taxes. This case seems to have an even higher welfare gain, but the short-run dynamics and political support for this reform is not analyzed.

these changes imply that (in consumption equivalent terms) we see a 5 percent increase in aggregate (equal weighted average) welfare. When transition dynamics is taken into account, the welfare gains are more modest but still positive, they are around 1 percent on average<sup>4</sup>. Probably more importantly, 75.4 percent of the population would be in favor of this reform. The tax reform which replace capital income taxation with higher labor income taxes has a more modest long-run welfare gain (3.5%) and would not gain public support in this environment.

We would draw significantly different conclusion about the desirability of the tax reforms if we used the pure life-cycle framework. First of all, from the long-run perspective, the elimination of all income taxes is again the reform which results in the highest welfare gains. However, this reform is detrimental from the welfare point of view when the transition is taken into account. According to Figure 4.14, the average welfare loss maybe of a magnitude of 10-12% in consumption equivalent terms. Hence, not surprisingly, this plan would gain only 9 percent support in the population. On the other hand, the elimination of capital taxes accompanied by a rise in labor taxes, is reducing welfare in the long run (by 0.4 percent), but would gain a popular support (63.5 percent) and would have a significant (around 3.5% ) average welfare gains from the initial population's point of view (see Figure 4.6) in the short run.

### 3 Taxing Capital Income in Incomplete Market Economies

The standard result in the traditional Ramsey approach to capital income taxation suggests that the elimination of capital income taxes is optimal in the long run (Judd, 1985 and Chamley, 1986). The optimal level of intertemporal (savings) distortion is set at zero, while intratemporal (labor supply) transitions are kept at a positive but stable level. These results may give the motivation for eliminating capital income taxation in the first place. However, they are based upon three key assumptions which are relevant to the current paper:

1. Agents live for infinitely many periods.
2. There is no ex ante heterogeneity in the economy.
3. If there is ex post heterogeneity, there are a complete set of securities which provide full insurance against idiosyncratic shocks.

None of these assumptions are satisfied by the current set-up, and therefore it is not obvious at all, whether a zero level of capital income taxation is optimal in this environment. In particular, there are a few papers who argue that it maybe optimal to tax capital income when one or more assumption above is not satisfied.

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<sup>4</sup>The paper does not provide the exact numbers, but they can be guessed from figures 4.12 and 4.13.

**Life-cycle Economies** In the pure life-cycle framework, Erosa and Gervais (2002) and Garriga (2003) have shown that it maybe optimal to tax capital, especially if labor income tax rates cannot depend on age. The intuition is that leisure in this environment is varying across the life-cycle. If labor income taxes cannot be age-dependent an (imperfect) substitute is capital income taxation as it can mimic labor taxation that is decreasing with age. In the current model, the elimination of capital income taxation is always preferable in the long run, independently of whether it is replaced by labor income or by consumption taxation. First of all, the models are quite different, the previous two papers do not consider any type of heterogeneity apart from age, therefore those models are isomorphic to a complete market scenario. Another important feature is that it is not clear how much labor supply changes over the life-cycle in the current paper. If it does not vary too much, then labor income taxes does not have to be age-dependent and the above role of capital income taxes is not present. Finally, the authors only consider two possible level of capital income taxes 0% and 35 percent, therefore we cannot say whether some positive but lower rate of capital income taxation can be welfare improving.

Conesa et. al (2006) study an even more related economy. Similarly to the current paper, in their economy agents live for finite periods, face permanent ability differences and transitory income shocks. The government can raise capital income taxes and potentially progressive labor income taxes. They study a pure life-cycle economy in the sense, that there are no altruism between generations. Their results are, to some extent, in contrast with the ones of the current paper. The optimal tax code includes a sizeable (36% percent) taxation of a capital income with proportional taxation of labor income with a deduction of 6000\$. The optimal capital income tax rate happens to be very close to the original level in this paper. Conesa et al. (2006) argue that the positive optimal tax rate on capital income is originating from the fact that most savings are made because of life-cycle reasons, and hence savings are not too sensitive to the level of taxes. For this reason, it is not very distortive to tax capital income. On the other hand, because of incomplete markets the tax system can improve welfare by providing more insurance. This is done by the progressivity of labor income taxes and by the capital income tax as well, as high income and consequently high wealth agents are the ones who will pay most of the capital income taxes.

First of all, this result confirms one of the results of the present paper, it is not optimal to eliminate capital income taxes if they are replaced by higher labor taxes. Conesa et. al (2006) go further; the optimal tax mix in their paper includes a higher capital income tax rate and a movement to a lower and more progressive labor income taxation compared to their estimate of the current system. In this reform, the negative general equilibrium effect (lower capital accumulation hence lower output and aggregate consumption) is more than offset by the higher insurance provided by the new system.

In order to interpret these differences, first note that (from the long run perspective) the current paper suggests a drastically different type of reform for the pure life-cycle economy, eliminate all income taxation and replace all of them by consumption taxes. In the light of the above discussion, consumption taxes

may serve as an even better insurance against incomplete markets. Insurance in this environment should increase consumption of agents with high marginal utility of consumption and decrease the consumption of those with low marginal utility. This is exactly what consumption taxes do, therefore we should not be surprised that they imply larger welfare gains than proportional labor taxes. One key question is remained to be answered: what is the difference, in terms of welfare, between a carefully designed progressive labor income taxation and the optimal consumption tax rate. Obviously, his question is beyond the scope of the current analysis.

Second, the current paper shows that, although it is detrimental for long-run welfare, agents would still vote for eliminating capital income taxation. The reason is that the majority (middle age to old people) hold assets and would like to maximize the return on their assets for life-cycle reasons. A similar argument seems to hold for the tax reform of Conesa et. al, middle-age and old agents will benefit much less from the extra insurance of the progressivity of labor taxation, but they can benefit a lot from the elimination of asset taxes. This would question the sustainability of the optimal tax system with positive capital income taxation in their framework as well. The same reasoning also explains why the tax reform involving consumption taxes cannot be popular. This reform tax wealthy and older people more and have benefits only in the long run.

**Infinitely Lived Agent Economies with Incomplete Markets** In the benchmark dynastic model, the tax reform where consumption taxes are used to replace all income taxation can gain public support on the other hand. Later, I will try to shed some light on why the intergenerational linkages in this economy make this tax reform implementable. First, however, note the dynastic model is closely related to models with infinitely lived agents since all future generations' welfare is internalized when economic decisions are made because of intergenerational linkages. Therefore, first I review some of the literature on the desirability of capital income taxation with uninsurable earnings risk and incomplete markets.

In a recent paper, Davila et. al (2007) study the optimal level of capital stock in incomplete market environments. They argue that if the income process is such that low life-time utility agents rely mostly on labour income then a higher aggregate capital shock typically increases (aggregate) social welfare, hence capital accumulation should be subsidized. If the low life-time utility agents rely mostly on capital income then lower aggregate capital shock typically increases (aggregate) social welfare, hence capital income should be taxed. The first scenario can be described as an economy where idiosyncratic shocks are given by different non-negative levels of earnings, while in the latter earnings shocks are more similar to unemployment hocks, where earnings are zero when negative shocks hit. The shock process of the current paper fits better the first case. In this case, their conclusion suggests that capital income should be rather subsidized than taxed. This is the case, because higher capital accumulation

is increasing wages and decrease the interest rate. The increasing wages will benefit poor (low life-time utility) agents whose major source of income is coming from labour earnings. This intuition should hold in the current paper as well, and therefore it can be the main reason why it is optimal to eliminate capital income taxation.

However Davila et. al (2007) compare only steady states, and a different conclusion is drawn by Domeij and Heathcote (2004) who study the transition dynamics as well. That paper considers an economy with incomplete markets and infinitely lived agents similar to Davila et al (2007). They consider the elimination of capital income taxes with an accompanying increase in labor or consumption taxes. They find that although there are significant welfare gains when we compare steady states, there are significant welfare losses in the short run, when the whole transition path is taken into account. Intuitively, the general equilibrium gains through higher capital accumulation and wages are realized only in the long run. In contrast, labor income taxes (or consumption taxes) need to increase in the short run to replace the loss of capital income tax revenue. This will hurt everyone and especially the poor whose income is concentrated in labor income. Richer agents may benefit even in the short-run because of the increase in after tax interest rates, but the overall effect is negative. First of all, it is not clear whether this results is actually in contrast with Davila et. al (2007) or not, since the latter paper does not take into account the transition dynamics. Probably more importantly, the burden of financing the capital subsidies is not distributed equally across individuals in their framework (they consider individual specific labor taxes, which keep total wealth intact). Therefore, one would expect that there maybe significant welfare gains even taking into account the transition in their framework.

Domeij and Heathcote also considers a case where the lost capital income tax revenue is financed by a raise in consumption taxation. Similarly to the current paper, they find this reform more attractive but still this reform would not gain a political support and would be welfare-reducing. These results are similar to the current paper, but the welfare losses are higher and the reforms have less support. Unfortunately, Domeij and Heathcote (2004) does not consider a reform which replaces all income taxation with consumption taxes. In the current paper, this reform gains public support and it has the highest welfare gains both in the short and long run. Based upon the calculations of Domeij and Heathcote (2004), one can conjecture that in their environment that reform would not get political support and may not be welfare improving in the short run either.

The final question is that, how Fuster et. al can detect higher welfare gains and higher political support for all of these tax reforms despite the fact that their dynastic model is (qualitatively) more similar to an infinitely lived agent economy. This is even more striking if we take into account that, in the their model, labour and consumption taxes are distortionary, which is not the case in Domeij and Heathcote (2004). The intuition is coming from two sources. First, the general equilibrium gains from the tax reform are realized in this environment through the medium and long-run but the welfare losses due to

higher consumption and labor taxes are immediate. In the dynastic environment studied here, these short-run losses are mitigated by the fact that future generations can directly compensate the current generations for these welfare losses by inter vivos transfers. In the typical infinitely lived agent model such compensation is not available. Second, the presence of retirement makes savings more important in this dynastic framework. During a significant proportion of their lives, households have only the offsprings receive labor income, hence they have to rely more on assets. This implies that savings have an important life-cycle component in this model in addition to the precautionary saving motive which is in turn mitigated by the insurance provided within the dynasty. This implies that higher net returns on asset accumulation are valued more in this environment. Both these arguments rely on the life-cycle features this model adds to the standard infinitely lived incomplete markets framework.

## 4 Conclusion and Directions for Future Research

This paper provides a complex but compelling modelling framework for studying incomplete market economies where life-cycle elements are combined with dynastic elements. The application of social security reform in Fuster et. al (2006) and the current application to capital tax reform already show the power of this environment. However, there are still many important issues which this model can be applied to.

First of all, it is unclear how well this model can replicate the wealth distribution across U.S. households. The authors point out that the benchmark model generate a considerable concentration of wealth somewhat below the concentration of wealth in the U.S. economy. They also show that their model generate a similar amount of wealth in the hand of 75 and older than in the U.S. data. They also show that, in their model, 81 percent of inter vivos transfers is going from parents to offsprings which is very close to the data counterpart of 75 percent. These are promising statistics and they suggest that this model can be used and/or recalibrated to match the U.S. wealth distribution across different age groups.<sup>5</sup> If the model can successfully do that this model may serve as a new benchmark where the life-cycle and the precautionary motive of savings is considered seriously together with family as a vehicle for insurance.

There is a potential problem here. Given the fact that there is perfect insurance across different generations within the same household, it is not clear how we can recover the wealth of parents and offsprings separately from the model.<sup>6</sup> In comparison with the data, it is crucial because there are very few households in the U.S. where 25-55 year old offsprings live together with their parents. Probably, bequests and a trade in Arrow securities can provide a unique decentralization for this environment. Nevertheless, this exercise would

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<sup>5</sup>Castaneda et. al (2003) provide a calibration which reproduces the U.S. wealth distribution in an economy with infinitely lived agents and incomplete markets.

<sup>6</sup>The paper does not give sufficient information how the wealth of the agents above 75 years old were recovered from the benchmark model.

be extremely valuable to understand better the implications of the model for the wealth distributions. After wealth and bequests are recovered, inter vivos transfers can be computed as well. This model then can shed light on how much insurance individuals can obtain across generational links. This is particularly important because, in the literature of consumption inequality, it seems to be that the key direction of research is moving towards sources of partial insurance.<sup>7</sup> In this model, as in the real world, families are the key source for obtaining (partial) insurance against idiosyncratic earnings shocks.

One key assumption in the model is that borrowing is not allowed. This might have important welfare implications for the tax reforms considered.<sup>8</sup> More generally, the introduction of borrowing may shed some further light on the relative importance of intrafamily insurance versus financial markets. In this model, for many young individuals parents can alleviate the borrowing constraints through inter vivos transfers. However, a significant proportion of households loses this possibility of insurance because their parents had died. For this group, borrowing constraints can be particularly harmful. This has two implications, first one may want to assess whether the introduction of borrowing may change the conclusions of the paper. That seems unlikely. A more important question is what type of social or private insurance instruments can provide insurance against this type of risk. It seems that offsprings have a strong incentive to obtain life-insurance contracts for their parents. From the social insurance point of view, some proportion of the “unused” social security payments can be made inheritable, which would again insure offsprings against risk to the family structure.

To sum it up, this is a great paper both because it gives new and interesting answers to important and unresolved questions and both because it shows that interfamily insurance can be a powerful instrument to offset potentially large short-run welfare losses. Maybe more importantly, this paper provides a sophisticated machinery, which can be used to understand several other important economic issues such as the determinants of the wealth distribution or sources of partial consumption insurance.

## References

- [1] Ábrahám, Á. and E. Cárceles-Poveda (2007), “Endogenous Trading Constraints with Incomplete Asset Markets”, Unpublished Manuscript, University of Rochester.
- [2] Blundell, R. (2006), “From Income to Consumption: Partial Insurance and the Transmission of Inequality”, Presidential Address: Econometric Society, Vienna.

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<sup>7</sup>See Blundell (2006) for an empirical argument why economists should be interested in partial insurance.

<sup>8</sup>Ábrahám and Cárceles-Poveda (2007) show that introducing borrowing into the environment studied by Domeij and Heathcote has important implications especially if the borrowing limits are endogenous.

- [3] Castaneda A., Diaz Gimenez, J. and J. V. Rios-Rull (2003), "Accounting for Earnings and Wealth Inequality", *Journal of Political Economy* 111(4), 818-857.
- [4] Chamley, C. (1986), "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives", *Econometrica*, 54(3), 607-622.
- [5] Conesa, J., S. Kitao and D. Krueger (2006), "Taxing Capital? Not a Bad Idea After All!", Unpublished Manuscript, University of Pennsylvania.
- [6] Davila, J., Hong, J. H., Krusell, P. and J. V. Rios-Rull (2005), "Constrained Efficiency in the Neoclassical Growth Model with Uninsurable Idiosyncratic Shocks", Unpublished Manuscript, CERMSEM, University of Pennsylvania and Princeton University.
- [7] Domeij D. and J. Heathcote (2004), "On the Distributional Effects of Reducing Capital Taxes", *International Economic Review*, 45, 523-554.
- [8] Erosa, A, and M. Gervais (2002), "Optimal Taxation in Life-Cycle Economies", *Journal of Economic Theory*, 105, 338-369
- [9] Fuster, L., İmrohoroğlu, A. and İmrohoroğlu, S. (2007), "Elimination of Social Security in a Dynastic Framework", forthcoming in *Review of Economic Studies*.
- [10] Garriga, C. (2003), "Optimal Fiscal Policy in Overlapping Generations Models", Unpublished Manuscript, Florida State University.
- [11] Judd, K. (1985). "Redistributive Taxation in a Simple Perfect Foresight Model", *Journal of Public Economics* 28(1), October, pp. 59-83.