Opponent's Report on Dissertation Thesis

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Title of the Thesis:	Residential energy consumption in Ukraine: Does energy price matter for energy savings?
Type of Defense:	**DEFENSE**
Date of Pre-Defense	April 26, 2023
Opponent**:**	Nithin Umapathi PhD (World Bank)

Address the following questions in your report, please:

a) Can you recognize an original contribution of the author?
b) Is the thesis based on relevant references?
c) Is the thesis defendable at your home institution or another respected institution where you gave lectures?
d) Do the results of the thesis allow their publication in a respected economic journal?
e) Are there any additional major comments on what should be improved?
f) What is your overall assessment of the thesis? (a) I recommend the thesis for defense without substantial changes, (b) the thesis can be defended after revision indicated in my comments, (c) not-defendable in this form.

(Note: The report should be at least 2 pages long.)

Pre-defense comments:

The dissertation thesis estimates the consumption responsiveness due to electricity and gas price increases and analyzes patterns of energy-efficient measures adopted in a region of Ukraine. The research questions from the first two chapters are well presented and have merit. This is especially the case now, when price volatility is very high, and energy diversification and climate change are on top of the policy agenda around the world. The thesis has strong policy implications and the first two papers have already been published in a highly regarded sub-field journal. I also commend the author for collecting original data used in the thesis. Therefore, chapters 2 and 3 are an original contribution.

The complementary topic that could inform how to facilitate transition to more energy efficient consumption is also research relevant and important. Thus, chapter 4 could help make a research and policy contribution but currently does not. I recommend that the thesis can be defended after revision indicated in my comments related to chapter 4.

My comment regarding this chapter is as follows. This chapter is not yet of near publication quality as it does not yet answer the question set in this chapter, that is, what encourages households to make renovations to their homes. The main result of this analysis is a description of a pattern of EE adoption by household characteristics based on a probit regression. While there is value in profiling the households that undertook different EE initiatives, the explanations provided for the key result – that the households with lower incomes, lower education and with a household member working abroad are more likely to invest in EE – are unsatisfactory. At a basic level, my prior tells

me that the key factors driving EE investments are renovation cost, amortization of investment, technical barriers, behavioral nudges, and financial incentives. I would expect that low educated and lower income households are more credit constrained, hence less likely to adopt unless the cost is commensurately lower, so some interaction effects would be helpful in the regression based on the type of renovation and education status. In any case, the result is counterintuitive and interesting. However, the explanation that such households may be dwelling in inferior housing is unsatisfactory as the regression controls for the age of the building among other proxies for housing quality.

More generally, this chapter would benefit from presentation of a simple model of household choice in adopting EE upgrades. The model could predict/present some of the expected effects, and thus inform how certain socio-economic and building characterics would correlate with EE adoption. In other words, it would help to have a simple model introduced in this chapter that would provide a theoretical link from the predicted effects to the observed heterogeneity. This could help link the framework to the results based on the original survey collected by the author.

My next question is why such correlations even matter? And what would be the policy implication? One policy implication I can think of is to understand the returns to EE investments by different household socio-economic characteristics (SES). Since there is such heterogeneity in adoption, there may be inefficiencies (under-investment) which targeted subsidization could address. As a first step, it would be useful to have a basic cost-benefit calculation for the households for these renovations and if it even makes sense for an average household. Similarly, what is the cost benefit by type of household (low, high ed, low income/high income, etc). Alternatively, it would be helpful to understand if the SES characteristics proxy building type and thus cost of renovation.

Second, is there a way to link data on billing to understand whether certain households types (as classified in Table 7) have bigger bills as percentage of household income (net of HUS) and are therefore more likely to invest in EE? This is related to the previous question. In other words, does the profile of adoption behavior shown in Table 7 align with the predicted cost-benefit profile? This would help find evidence of types of inefficiency by SES and generate evidence for subsidization according to certain profiles of households which have highest gap in terms of benefit and EE investment cost.

An extension of the above analysis would be helpful that could predict or quantify the value of extra EE investment for different types of households defined in the thesis to close the gap (e.g. educated vs. less educated, higher vs. lower income, family with children vs. without building type etc)? This is because much of the subsidization of consumption is via the HUS program. And it would be a very good contribution to see whether the profile of HUS beneficiaries are also similar to the profile of those with the highest gap in terms of benefits and actual investment in EE. This would make a very strong case for developing policy tools that could profile such households, so that they could be supported with EE subsidies to graduate them from energy assistance. In other words, complement HUS payments with energy efficiency subsidies (lumpsum or debt financed). It would be very helpful to know if profile of HUS beneficiaries is similar to those with high benefit to cost ratios for EE renovations. Then targeting energy efficiency subsidy becomes much easier. Showing this approach as a formal methodology to target EE subsidies, would be a very good policy relevant contribution.

Generally, this chapter could benefit from a more focused statement of the hypothesis or objective that is actually aligned with the results. Also, it would be ok to provide suggestive evidence with relevant caveats to a well stated hypothesis along with a simple framework of household energy efficiency decisions. Otherwise, this chapter is a set of descriptive results not linked to the literature nor to a clear decision-making framework nor to policy implications.

Defense comments:

In sum, the thesis is an original contribution. Thesis is based on relevant references and is defendable since it addressed my comments above.

I have commented on the draft and after reviewing the responses and the thesis I have no further comments. I recommend the thesis for defense without substantial changes.

Date:	Nov 4, 2023
Opponent's Signature:	
Opponent's Affiliation:	Nithin Umapathi PhD (World Bank)