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# What drives post-acquisition farm growth? Empirical evidence from Ukraine

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## Electronic supplementary material (ESM)

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Supplementary Table S1. Model 1: Estimation results of PAI instruments effects on organic growth with system GMM model, 2005–2016

| Group of variables                       | Variable name   | Coefficient                                  | z-value  | $P >  z $ | 95% CI |        |        |       |
|--|---|--|--|-----------|--------|--------|--------|-------|
| Farm size                                | crop production value <sup>1</sup>                      | 0.006  | 1.61   | 0.107     | -0.001 | 0.013  |        |       |
| Performance                              | farm growth   | $\Delta$ crop production value <sup>1</sup>  | -0.157   | -1.80     | 0.071  | -0.327 | 0.014  |       |
|  | resource reallocation                                   | $\Delta$ share of crop production            | 2.269  | 7.10      | 0.000  | 1.643  | 2.895  |       |
|  |   | $\Delta$ ratio of harvested to arable land   | 1.134  | 6.32      | 0.000  | 0.782  | 1.485  |       |
|  | investment/<br>divestment –<br>variable inputs          | $\Delta$ material costs <sup>1</sup>         | 0.062  | 1.22      | 0.223  | -0.038 | 0.162  |       |
| Post-acquisition<br>integration<br>(PAI) | investment/<br>divestment –<br>fixed assets &<br>labour | $\Delta$ depreciation <sup>1</sup>           | 0.010  | 1.71      | 0.087  | -0.002 | 0.022  |       |
|  |   | $\Delta$ land area <sup>1</sup>              | 0.840  | 8.72      | 0.000  | 0.651  | 1.029  |       |
|  |   | $\Delta$ labour units in CP <sup>1</sup>     | -0.007   | -0.18     | 0.856  | -0.083 | 0.069  |       |
|  |   | investment/<br>divestment –<br>services      | $\Delta$ 3 <sup>rd</sup> party services <sup>1</sup> | 0.020     | 2.34   | 0.019  | 0.003  | 0.037 |
|  |   | resource<br>redeployment                     | $\Delta$ land rent payment <sup>1</sup>              | -0.011    | -1.21  | 0.227  | -0.029 | 0.007 |
|  |   | $\Delta$ salary <sup>1</sup>                 | 0.011  | 0.83      | 0.407  | -0.015 | 0.038  |       |
| Control variables                        |   | restructuring dummy                          | 0.086  | 1.63      | 0.103  | -0.017 | 0.190  |       |
|  |   | acquired from another<br>agroholding – dummy | 0.105  | 1.98      | 0.048  | 0.001  | 0.208  |       |

<sup>1</sup>log-transformed variable

CP – crop production

Source: Own elaboration

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Supplementary Table S2. Model 2: Estimation results of PAI instruments effects on organic growth with system GMM model, 2005–2016

| Group of variables                 | Variable name                      | Coefficient  | z-value | $P >  z $ | 95% CI |        |       |
|------------------------------------|------------------------------------|--|---------|-----------|--------|--------|-------|
| Farm size                          | crop production value <sup>1</sup> | 0.005  | 1.51    | 0.132     | -0.002 | 0.012  |       |
| Performance                        | farm growth                        | $\Delta$ crop production value <sup>1</sup>          | -0.163  | -1.85     | 0.064  | -0.336 | 0.010 |
|                                    | resource                           | $\Delta$ share of crop production                    | 2.253   | 7.12      | 0.000  | 1.633  | 2.874 |
|                                    | reallocation                       | $\Delta$ ratio of harvested to arable land           | 1.176   | 6.82      | 0.000  | 0.838  | 1.514 |
|                                    | investment/                        | $\Delta$ seeds <sup>1</sup>                          | 0.007   | 0.45      | 0.650  | -0.024 | 0.039 |
|                                    | divestment –                       | $\Delta$ fertilisers <sup>1</sup>                    | 0.017   | 1.96      | 0.050  | 0.000  | 0.035 |
|                                    | variable inputs                    | $\Delta$ other material costs <sup>1</sup>           | 0.004   | 0.55      | 0.581  | -0.009 | 0.017 |
|                                    | investment/                        | $\Delta$ depreciation <sup>1</sup>                   | 0.012   | 1.99      | 0.047  | 0.000  | 0.024 |
| Post-acquisition integration (PAI) | divestment – fixed assets & labour | $\Delta$ land area <sup>1</sup>                      | 0.839   | 9.26      | 0.000  | 0.661  | 1.017 |
|                                    |                                    | $\Delta$ labour units in CP <sup>1</sup>             | -0.009  | -0.23     | 0.819  | -0.081 | 0.064 |
|                                    | investment/                        | $\Delta$ 3 <sup>rd</sup> party services <sup>1</sup> | 0.019   | 2.50      | 0.012  | 0.004  | 0.034 |
|                                    | divestment – services              |  |         |           |        |        |       |
|                                    | resource                           | $\Delta$ land rent payment <sup>1</sup>              | -0.010  | -0.98     | 0.326  | -0.030 | 0.010 |
|                                    | redeployment                       | $\Delta$ salary <sup>1</sup>                         | 0.009   | 0.72      | 0.474  | -0.015 | 0.033 |
|                                    |                                    | restructuring dummy                                  | 0.086   | 1.65      | 0.099  | -0.016 | 0.189 |
| Control variables                  |                                    | acquired from another agrohholding – dummy           | 0.112   | 2.21      | 0.027  | 0.013  | 0.211 |

<sup>1</sup>log-transformed variable

CP – crop production

Source: Own elaboration

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Supplementary Table S3. Model 3: Estimation results of PAI instruments effects on organic growth, system GMM model, 2005–2016

| Group of variables                 | Variable name                              | Coefficient  | z-value | $P >  z $ | 95% CI |        |        |
|------------------------------------|--|--|---------|-----------|--------|--------|--------|
| Farm size                          | crop production value <sup>1</sup>         | 0.004  | 1.27    | 0.204     | -0.002 | 0.010  |        |
| Performance                        | farm growth                                | $\Delta$ crop production value <sup>1</sup>          | -0.150  | -1.89     | 0.058  | -0.305 | 0.005  |
|                                    | profitability                              | $\Delta$ EBITDA                                      | -0.023  | -2.24     | 0.025  | -0.044 | -0.003 |
|                                    | indebtedness                               | $\Delta$ current liquidity                           | 0.000   | -0.50     | 0.616  | -0.001 | 0.001  |
|                                    |  | $\Delta$ debt-to-assets                              | 0.104   | 3.20      | 0.001  | 0.040  | 0.167  |
| Post-acquisition integration (PAI) | resource reallocation                      | $\Delta$ share of crop production                    | 2.306   | 6.61      | 0.000  | 1.622  | 2.989  |
|                                    |  | $\Delta$ ratio of harvested to arable land           | 1.113   | 6.26      | 0.000  | 0.765  | 1.461  |
|                                    | investment/                                | $\Delta$ seeds <sup>1</sup>                          | 0.003   | 0.19      | 0.852  | -0.031 | 0.038  |
|                                    | divestment –                               | $\Delta$ fertilisers <sup>1</sup>                    | 0.007   | 0.73      | 0.466  | -0.012 | 0.027  |
|                                    | variable inputs                            | $\Delta$ other material costs <sup>1</sup>           | 0.014   | 1.50      | 0.133  | -0.004 | 0.031  |
|                                    | investment/                                | $\Delta$ depreciation <sup>1</sup>                   | 0.009   | 1.31      | 0.189  | -0.005 | 0.023  |
|                                    | divestment –                               | $\Delta$ land area <sup>1</sup>                      | 0.828   | 8.90      | 0.000  | 0.645  | 1.010  |
|                                    | fixed assets &                             | $\Delta$ labour units in CP <sup>1</sup>             | -0.014  | -0.40     | 0.689  | -0.085 | 0.056  |
|                                    | labour                                     |  |         |           |        |        |        |
|                                    | investment/                                | $\Delta$ 3 <sup>rd</sup> party services <sup>1</sup> | 0.018   | 2.09      | 0.037  | 0.001  | 0.034  |
| divestment –                       | $\Delta$ SG&A <sup>1</sup>                 | 0.001  | 0.18    | 0.855     | -0.008 | 0.010  |        |
| services                           |  |  |         |           |        |        |        |
| resource                           | $\Delta$ land rent payment <sup>1</sup>    | -0.007   | -0.63   | 0.529     | -0.029 | 0.015  |        |
| redeployment                       | $\Delta$ salary <sup>1</sup>               | -0.004   | -0.28   | 0.783     | -0.032 | 0.024  |        |
|                                    | restructuring dummy                        | 0.114  | 2.35    | 0.019     | 0.019  | 0.209  |        |
| Control variables                  | acquired from another agrohholding – dummy | 0.089  | 1.44    | 0.150     | -0.032 | 0.210  |        |

<sup>1</sup>log-transformed variable

CP – crop production; EBITDA – earnings before interest, taxes, depreciation, and amortisation; SG&A – selling, general, and administrative

Source: Own elaboration

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Supplementary Table S4. Model 4: Estimation results of lagged farm characteristics effects on organic growth, system GMM model, 2005–2016

| Group of variables                      | Variable name                                  | Coefficient   | z-value                         | $P >  z $ | 95% CI |        |        |        |
|---|--|---|---------------------------------|-----------|--------|--------|--------|--------|
| Performance                             | farm growth                                    | crop production value change <sup>1</sup>               | -0.228                          | -6.50     | 0.000  | -0.297 | -0.159 |        |
|   | resource                                       | share of crop production                                | -0.170                          | -1.09     | 0.276  | -0.477 | 0.136  |        |
|   | reallocation                                   | ratio of harvested to arable land                       | -0.716                          | -4.62     | 0.000  | -1.020 | -0.413 |        |
|   | investment/<br>divestment –<br>variable inputs | material costs <sup>1</sup>                             | 0.109                           | 3.53      | 0.000  | 0.049  | 0.170  |        |
|   | Post-acquisition<br>integration<br>(PAI)       | investment/<br>divestment –<br>fixed assets &<br>labour | depreciation <sup>1</sup>       | -0.030    | -3.61  | 0.000  | -0.046 | -0.014 |
|   |  |   | labour units in CP <sup>1</sup> | 0.138     | 2.28   | 0.023  | 0.019  | 0.258  |
| investment/<br>divestment –<br>services |  | 3 <sup>rd</sup> party services <sup>1</sup>             | -0.023                          | -2.75     | 0.006  | -0.039 | -0.007 |        |
| resource<br>redeployment                |  | land rent payment <sup>1</sup>                          | -0.047                          | -1.92     | 0.055  | -0.096 | 0.001  |        |
|   | salary <sup>1</sup>                            | -0.029  | -1.65                           | 0.099     | -0.064 | 0.005  |        |        |
|   | $n$ of years after the acquisition             | -0.052  | -4.27                           | 0.000     | -0.077 | -0.028 |        |        |
| Control variables                       | acquired from another<br>agroholding – dummy   | 0.067   | 0.87                            | 0.384     | -0.084 | 0.219  |        |        |

<sup>1</sup>log-transformed variable

CP – crop production

Source: Own elaboration

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Supplementary Table S5. Model 5: Estimation results of lagged farm characteristics effects on organic growth, system GMM model, 2005–2016

| Group of variables                 | Variable name   | Coefficient                                  | z-value | $P >  z $ | 95% CI |        |        |
|------------------------------------|---|--|---------|-----------|--------|--------|--------|
| Farm size                          | crop production value <sup>1</sup>                      | 0.038  | 0.71    | 0.478     | -0.067 | 0.142  |        |
| Performance                        | farm growth   | crop production value change <sup>1</sup>    | -0.240  | -7.30     | 0.000  | -0.304 | -0.175 |
|                                    | resource reallocation                                   | share of crop production                     | -0.231  | -1.07     | 0.287  | -0.656 | 0.194  |
|                                    |   | ratio of harvested to arable land            | -0.769  | -3.77     | 0.000  | -1.169 | -0.369 |
|                                    | investment/<br>divestment –<br>variable inputs          | material costs <sup>1</sup>                  | 0.076   | 1.86      | 0.063  | -0.004 | 0.157  |
| Post-acquisition integration (PAI) | investment/<br>divestment –<br>fixed assets &<br>labour | depreciation <sup>1</sup>                    | -0.027  | -3.05     | 0.002  | -0.045 | -0.010 |
|                                    |   | labour units in CP <sup>1</sup>              | 0.155   | 2.39      | 0.017  | 0.028  | 0.282  |
|                                    | investment/<br>divestment –<br>services                 | 3 <sup>rd</sup> party services <sup>1</sup>  | -0.028  | -3.00     | 0.003  | -0.046 | -0.010 |
|                                    | resource redeployment                                   | land rent payment <sup>1</sup>               | -0.044  | -1.70     | 0.089  | -0.095 | 0.007  |
|                                    |   | salary <sup>1</sup>                          | -0.029  | -1.55     | 0.120  | -0.065 | 0.008  |
|                                    |   | $n$ of years after the acquisition           | -0.056  | -3.71     | 0.000  | -0.085 | -0.026 |
| Control variables                  |   | acquired from another<br>agroholding – dummy | 0.063   | 0.80      | 0.426  | -0.092 | 0.219  |

<sup>1</sup>log-transformed variable

CP – crop production

Source: Own elaboration

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Supplementary Table S6. Model 6: Estimation results of lagged farm characteristics effects on organic growth, system GMM model, 2005–2016

| Group of variables                 |   | Variable name                               | Coefficient | z-value | $P >  z $ | 95% CI |        |
|------------------------------------|---|---|-------------|---------|-----------|--------|--------|
| Farm size                          |   | crop production value <sup>1</sup>          | 0.032       | 0.62    | 0.536     | -0.069 | 0.132  |
| Performance                        | farm growth   | crop production value change <sup>1</sup>   | -0.173      | -4.06   | 0.000     | -0.257 | -0.089 |
|                                    | profitability   | profit margin                               | -0.299      | -2.29   | 0.022     | -0.555 | -0.043 |
|                                    | indebtedness  | current liquidity                           | 0.002       | 1.62    | 0.105     | -0.001 | 0.005  |
|                                    |   | debttoassets                                | 0.026       | 0.64    | 0.521     | -0.053 | 0.105  |
| resource reallocation              | share of crop production                                | -0.238                                      | -0.99       | 0.321   | -0.709    | 0.232  |        |
|                                    | ratio of harvested to arable land                       | -0.771                                      | -3.59       | 0.000   | -1.191    | -0.350 |        |
| Post-acquisition integration (PAI) | investment/<br>divestment –<br>variable inputs          | material costs <sup>1</sup>                 | 0.107       | 3.75    | 0.000     | 0.051  | 0.163  |
|                                    | investment/<br>divestment –<br>fixed assets &<br>labour | depreciation <sup>1</sup>                   | -0.017      | -2.03   | 0.042     | -0.032 | -0.001 |
|                                    |   | labour units in CP <sup>1</sup>             | 0.103       | 2.88    | 0.004     | 0.033  | 0.173  |
|                                    | investment/<br>divestment –<br>services                 | 3 <sup>rd</sup> party services <sup>1</sup> | -0.036      | -3.12   | 0.002     | -0.058 | -0.013 |
|                                    |   | SG&A <sup>1</sup>                           | -0.017      | -3.15   | 0.002     | -0.028 | -0.007 |
|                                    | resource<br>redeployment                                | land rent payment <sup>1</sup>              | -0.030      | -1.17   | 0.242     | -0.079 | 0.020  |
|                                    |   | salary <sup>1</sup>                         | -0.026      | -1.42   | 0.157     | -0.063 | 0.010  |
| Control variables                  | $n$ of years after the acquisition                      |   | -0.039      | -2.70   | 0.007     | -0.067 | -0.011 |
|                                    | acquired from another<br>agroholding – dummy            |   | 0.002       | 0.01    | 0.989     | -0.220 | 0.223  |

<sup>1</sup>log-transformed variable

CP – crop production; SG&A – selling, general, and administrative

Source: Own elaboration