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Self-Employment and the Earnings Distribution:
Have Globalization and European Integration caused Convergence?

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I. Introduction.

How much do countries differ in the extent to which workers are self-employed? Are the consequences for the income distribution similar in every country, or do they differ in systematic ways? There is really no disputing that self-employment is an important labor market phenomenon that ought to have distributive consequences. The most recent OECD data (for 2004) on the proportion of the labor force that is self-employed show an “OECD total” of 17.4%, with a wide range, from less than 8% in Norway and the US to more than 30% in Korea, Mexico and Turkey.

Cross-national studies of self-employment were sparse in the 1990’s. For example, the survey by Le (1999) contains not a single example. The working paper by Acs, Audretsch and Evans (1994) is the most commonly cited paper from the period. Greater attention has been paid to self-employment in the last several years, including articles by Robson and Wren (1999), Blanchflower (2000), Parker and Robson (2004) and Torrini (2005). Key results of these recent articles are summarized in the next section.

With the partial exception of Blanchflower (2000), the recent papers focus almost exclusively on the *causes* of cross-national differences in the prevalence of self-employment, and treat self-employment as a decision made by workers, rather than households. The research has little to say about the *consequences* of cross-national differences, particularly the income distribution consequences. While the OECD provides a one-stop shop for much of the data required to study the causes of self-employment among the labor force, the Luxembourg Income Study (LIS) can be used to supplement the OECD to focus on household measures of self-employment and the distributive effects of self-employment.

In a working paper written almost a decade ago (Sullivan and Smeeding, 1997) we found that self-employment plays a major role in altering the market income distribution in every one of the nineteen countries we studied. In particular, we found that households reliant exclusively on self-employment income tended to clump in the upper and lower tails of the market income distribution, that households that combine self-employment with employment earnings were concentrated in the upper tail of the distribution, and that these broad distributive patterns were to be found in almost every country in the dataset.

This paper is a sequel that asks three basic questions:

- 1) Are the patterns of household self-employment and its distributional consequences that we found in Wave III (around 1990) of LIS still to be found in the larger and more recent sample of countries in Wave V (around 2000)?
- 2) Has there been noticeable cross-national convergence during the 1990’s, particularly in Europe (perhaps due to the Single Market and EU enlargement)?
- 3) Do the variables that seem to “explain” cross-national differences in the prevalence of self-employment also “explain” cross-national differences in the distributive consequences? If so, which are the most important?

II. Previous Research About Self-Employment in OECD Countries.

It is often the case that data designs determine research designs, and the study of self-employment in OECD countries is a prize example. The OECD maintains a time series of the percentage of the civilian labor force that is self-employed and a raft of potential regressors to put on the right side of a reduced-form regression. The seminal example is Acs, Audretsch and Evans (1994), a working paper that established the basic stylized fact that the prevalence of self-employment in a country is negatively correlated with the country's level of development, and that this stylized fact seems robust when other controls are included.

The first important published paper using panel data techniques to explore the self-employment rate was Robson and Wren (1999). The focus of their paper is upon the effect of taxes-- a natural focus, since one of the obvious differences across national borders is differences in tax regimes. They find that high marginal tax rates tend to discourage self-employment and that high (and rising) average tax burdens tend to increase self-employment rates. Other significant controls include the level of per capita GNP (negative effect on self-employment rate, as expected), growth of unemployment, growth of manufacturing employment and level of service employment (all negative effects). Two subsequent papers that built upon Robson and Wren (1999) were Fölster (2002) and Robson (2003). Fölster verifies the importance of taxes, while Robson finds that careful analysis undermines the view that self-employment is heavily influenced by employer protection legislation.

The latest contributions to the study of OECD self-employment rates are Parker and Robson (2004) and Torrini (2005). Parker and Robson show that six of the twelve countries they survey have had increasing self-employment rates, three have had decreasing self-employment rates, and three have had roughly constant self-employment rates. Since the resulting panel data have substantial variation based on different trends as well as different levels, the authors are able to deploy an alternative dynamic panel technique ("Fully Modified OLS"—see Pedroni (2000)), and they discover that their results are quite sensitive to the technique employed. For example, the received conclusion that self-employment rates fall with real per capita GDP is sensitive to technique, as is the sign on the average tax rate. The other variables that have significant effects are the female labor force participation rate (negative) and rate at which unemployment benefits replace earnings (negative when significant).

Torrini (2005) follows a similar path, though he uses a different dynamic panel technique ("Dynamic OLS"—see Mark and Sul (2003)). His results are less sensitive to the technique chosen, with a negative effect of per capita GDP, a negative effect of public sector size, a positive effect of the unemployment rate, and possibly a negative effect of the tax "wedge." He verifies Robson's (2003) conclusion that employment protection legislation is unimportant, and he introduces two additional variables: a "corruption index" (which he interprets as evidence that tax laws may not be strictly enforced) and a measure of product market regulation. Although the introduction of new institutional variables is useful, because they define other measures of the role of national borders, the

particular variables do not work out very well, apparently because of high correlations with other variables.

Blanchflower's (2000) paper begins on a track similar to the others, but then veers off in a rather different direction. After starting off with an analysis somewhat similar to that of Robson and Wren (1999) (the authors do not seem to have been aware of one another's research), Blanchflower proceeds to the analysis of concatenated microdata for 19 countries collected over various lengths of time (in some cases over twenty years). He finds that the probability of self-employment rises with age and that the effect of the unemployment rate is country-specific (and often negligible).

III. Self-Employment Income Data: Problems and Prospects

We feel compelled to begin with the following truth-in-packaging disclaimer: survey data on self-employment income are not particularly accurate, and the degree of inaccuracy varies across countries. In a careful study of this matter, Atkinson, Rainwater and Smeeding (1995) provide evidence that "Self-employment income reporting differs substantially across surveys" (p. 36); the accompanying table suggests that, compared to national income aggregates, self-employment income is generally much more severely underreported than wage and salary income, and that the degree of underreporting varies across countries.

We have three reasons for embarking on the analysis in spite of our concerns about data quality. The first is that data quality matters less for some analyses than others. For example, as Gottschalk and Smeeding (1997) emphasize, systematic inaccuracies that arise from factors like cross-national differences in survey methodologies will affect relative *trends* of measured income much less than relative *levels*, so the data problems should be less of a concern when we ask whether self-employment metrics have *converged*. Second, an analysis that defines self-employment as "receipt of self-employment income" may shed a different light on the phenomenon itself. For example, our previous paper (1997) showed that the stereotype that self-employment is dominated by family firms that fully employ the household's workers is simply wrong: in most of the LIS countries, the majority of households with self-employment income also have wage and salary income. Third, and most important, we want to move the analysis away from the usual preoccupation with *why* more workers choose self-employment in some countries than in others, and instead ask, "*So what?*" For example, another conclusion from our previous analysis was that households with self-employment income tend to be concentrated in the tails of the market income distribution in almost every LIS country.

IV. Self-Employment Income in the Luxembourg Income Study

Every one of the thirty countries in the Luxembourg Income Study has at least one survey that includes a measure of household self-employment income. In fact, the Wave V (around the year 2000) datasets contain a variable that measures self-employment income at the level of the *individual*, though we stick to the *household* measure, partly because our emphasis is upon the household income distribution and partly to maintain comparability over time. In addition to the underreporting problem discussed above, the principal dilemma with these data is what to do about households that report losses from self-employment. Some surveys simply forbid them to report these losses as negative income, while other countries employ a bottom-code that is less than zero. Our response is twofold. First, we bottom-code self-employment income to 1 unit of local currency, so that non-positive reports are treated in a comparable way. Second, we employ measures that are relatively insensitive to the resolution of the dilemma: a household that reports negative self-employment income is still a household that reports such income, and if self-employment is its only source of earnings, it will be in the bottom quintile whether the report is recorded as negative or zero.

Turning to distributional questions, we need to define the exact measure of “income,” the distribution of which we propose to study. That measure will be “household non-farm earnings,” that is, the sum of the household’s wage and salary income and its non-farm self-employment income (bottom-coded to 1 unit of local currency). Households that have neither form of earnings (for example, households completely reliant on farm income or pensions or transfer payments) are simply excluded from the sample. Another problem is that some countries only report wage and salary incomes net of taxes. Other things equal, we would expect the self-employed to have higher relative earnings in those countries, and accordingly we have noted the identities of those countries in the tables by showing the country names in *italic type*.

V. Results: Proportion of Households with Self-Employment Income

The first question we want to ask is: what proportion of households have non-farm self-employment income (SEI) as their entire source of earnings? The results for Wave III (around 1990) and Wave V (around 2000) are shown in Tables 1 and 2, arranged as league tables from the highest to the lowest percentage with SEI only. Given the well-known correlation with per capita GDP, it is not surprising that Taiwan and Mexico are high in the tables. The presence of Italy, Spain and Greece near the top conforms with stereotypes of their economies as having a large informal sector of self-employed households. In Wave III, near the beginning of the transition period, the formerly Communist countries are all low in the table, though by Wave V, a decade later, Russia and Poland are high in the table, as one might expect.

One of the surprises from looking at self-employment through the lens of income is how many households report both self-employment income (SEI) and wage and salary income (WSI). In fact, in a majority of countries—13 out of 21 in Wave III, 16 out of 24 in Wave

V--, these “combiners” outnumber the households with SEI only. As indicated by the correlation coefficients on the tables, the proportion of a nation’s households that combine SEI with a smaller amount of WSI is highly correlated with the proportion that report SEI only. Those who combine WSI with a smaller amount of SEI are rather different: this group is especially prevalent in the North American and Nordic economies.¹

VI. Results: Percentages in Bottom and Top Quintiles.

The next question we want to ask is whether certain groups are overrepresented or underrepresented in the bottom quintile of the overall distribution of non-farm earnings. The results are shown in Tables 3 and 4. The basic result is dramatic: **households with SEI only are overrepresented in the bottom quintile, and households that combine SEI with WSI are underrepresented in the bottom quintile**, in practically every country in both years.

Obviously this result can be explained in part by systematic underreporting of SEI, but ought not underreporting also affect the households that have SEI>WSI? Speaking generally, the greatest overrepresentation among the SEI only (and the least underrepresentation among the SEI>WSI) is to be found in the Nordic countries, Switzerland, Canada, the US and the UK—countries that tend to conduct relatively careful surveys. The countries with the least overrepresentation are, generally speaking, those in which self-employment income is most prevalent.

The corresponding results for the top quintile are given as Tables 5 and 6. Again there is a clear result: **households with SEI only are underrepresented in the top quintile, and households that combine SEI with WSI are overrepresented in the top quintile**, in practically every country in both years. Note that underreporting of SEI cannot be the culprit in this case. Indeed, in most countries those with SEI>WSI are *more* overrepresented than those with WSI>SEI. In general, the Nordic countries are low on this particular league table, and it is interesting that Canada, the UK and the US all have overrepresentation statistics that are well below the cross-national averages.

The countries that are high in Tables 1 and 2 are generally low in Tables 3 and 4 and high in Tables 5 and 6; the countries that are low in Tables 1 and 2 are generally high in Table 3 and low in Tables 5 and 6. There are some exceptions², but it seems to be a valid generalization that **in countries in which a larger proportion of households earn self-employment income, those households are less overrepresented in the bottom quintile and more overrepresented in the top quintile.**

¹ This result may be distorted somewhat by the fact that the Nordic economies, Canada and the US all report gross wage and salary income, making WSI>SEI somewhat more likely. There is not, however, a close association overall between the relative sizes of the two groups of “combiners” and whether wage and salary income is measured net of taxes.

² The rank correlation between Tables 1 and 3 =-0.53; between Tables 1 and 5 =0.14 ; between Tables 2 and 4 =-0.35; and between Tables 2 and 6 =0.20.

VII. Have Self-Employment Metrics Converged?

Before answering the question in the section title, we must first answer, “Which self-employment metrics are we talking about?” We have selected four of them: 1) the percentage of households with SEI only; 2) the percentage of households with some SEI; 3) the percentage of the SEI-only households in the 1st (bottom) quintile; and 4) the percentage of the SEI-only households in the top quintile.

A second preliminary question is, “How is ‘convergence’ measured?” We have selected two measures: 1) the change in the coefficient of variation of the metric between Wave III and Wave V; and 2) the coefficient from regressing the change in the metric on its initial (Wave III) value. In both instances, then, “convergence” will be interpreted as a negative value.

The third (and last!) preliminary question is, “Convergence across what geographical area?” We first calculate the convergence metrics for the thirteen countries for which they can be calculated for both Wave III and Wave V: Canada, Finland, Germany, Israel, Italy, Mexico, Netherlands, Norway, Spain, Sweden, Switzerland, UK, and US. We then restrict the sample, first to the countries in either Europe or NAFTA, then to those in Europe only (including, of course, two non-EU countries, Norway and Switzerland). One might expect that convergence would be more obvious in the narrower groupings.

The results are displayed in Table 7. The simple answer to the question, “Have self-employment metrics converged?” is, “Not really.” Fewer than half of the values in Table 7 are negative, and only one is statistically significantly negative. Unfortunately, the reliability of these calculations is suspect, because four countries, all of them European, changed surveys between Wave III and Wave V: Luxembourg, Spain, Switzerland and the United Kingdom. In at least two of these countries, Luxembourg and Switzerland, the self-employment metrics changed to a degree that cannot plausibly be explained as a real economic change. It is obvious that omitting Luxembourg would cause the metrics to change in the direction of greater convergence (or lesser divergence), though it turns out that omitting all four countries does not alter the results very much at all.

In sum, the evidence for convergence of self-employment metrics is both slender and fragile, depending on both the method for measuring convergence and the selection of countries to which it is applied. While the prevalence of self-employment rose in some countries and fell in others (the latter group was larger), both the *relative* prevalence and the *relative* income distribution effects vary more across countries than over time.

VIII. What Correlates with Cross-National Variation?

The essential innovation of this paper is that it uses the Luxembourg Income Study to develop alternative variables for analysis. The question we want to ask in this section is how the analysis of these new variables differs from the analyses of the OECD self-employment data analyzed by Robson and Wren (1999), Blanchflower (2000), Parker and Robson (2004) and Torrini (2005). We want to emphasize that we are strictly looking at a single cross-section, whereas these previous authors exploited the panel properties of the OECD series to one degree or another. Our goal is to determine whether variables similar to those employed by these previous authors seem to account for the cross-section variation of our variables.

We have selected the same four analysis variables as the last section: 1) the percentage of households with SEI only; 2) the percentage of households with some SEI; 3) the percentage of the SEI only households in the 1st (bottom) quintile; and 4) the percentage of the SEI only households in the top quintile. We have selected eight covariates: 1) real GDP per capita; 2) Service industries as a percentage of value added; 3) unemployment rate; 4) percentage of the labor force with a “tertiary” degree; 4) Taxes as a % of GDP; 5) the Transparency International “Corruption Index,”³ as suggested by Torrini (2005); 6) an index of “Barriers to Entrepreneurship” devised by the OECD; and 7) a “Capital Access Index”⁴ devised by the Milken Institute. All of these data are available from the OECD website except #5) and #7), the origins of which are provided in the footnotes. We have matched these data with LIS data for as many countries as possible, using the Wave V data when available, and the Wave IV data otherwise, providing a dataset of 23 countries. When the covariates are available for multiple years, we have chosen a year as close to the survey year as possible.

Table 8 displays a correlation matrix. The top panel treats each nation as a single observation, regardless of the nation’s size. In the lower panel the calculations are weighted by population. We see first of all that the correlation between “% SEI only” and “% Some SEI” is very close,⁵ even though, as we discussed above, households combining SEI with WSI are often a majority of those with self-employment income.

The correlation between “% SEI only” and the proportion of the SEI-only group in the bottom quintile is *negative* for both the weighted and unweighted calculations: a higher proportion of households (only) self-employed is associated with a smaller proportion of (only) self-employed households in the bottom quintile. Though one hesitates to advance a causal chain to explain this correlation, it seems reasonable that reliance upon self-employment will be a more attractive when there is less evidence that being reliant on self-employment is a lottery ticket with a high probability of being assigned to the bottom of the income distribution. The correlation between “% SEI only” and the proportion of the SEI-only group in the top quintile is virtually zero for the unweighted calculation, but

³ <<http://www1.transparency.org/cpi/2000/cpi2000.html#cpi>>

⁴ See Yago, et.al., 2000.

⁵ The (unweighted) correlation with the OECD self-employment rate is 0.901 for “% SEI only” and 0.826 for “% Some SEI”.

positive for the weighted calculation. A positive coefficient would be consistent with the causal path suggested above: reliance on self-employment will be more attractive when it is associated with a lottery ticket with a higher probability of a high payoff.

The correlation coefficients of the quintile prevalence measures with the “% Some SEI” are the one set of coefficients for which the unweighted and weighted calculations give opposite signs. The basic reason is that weighting the calculations reduces the impact of the observation for Luxembourg, which contributes substantially to the result (both unweighted correlations change sign if Luxembourg is deleted).

We inserted the column of correlation coefficients with real GDP per capita to make a specific point: *every covariate is highly correlated with it* except Taxes as a % of GDP. Is it really any wonder that Parker and Robson (2004) find that the coefficient on this variable in a regression is not as consistently negative as suggested by the stylized facts (represented here by strong negative correlations with both “% SEI only” and “% Some SEI”)? It has been conventional ever since Acs, Audretsch and Evans (1994) to treat per capita GDP as a proxy for the nation’s capital/labor ratio, but it is actually a generalized measure of economic development that is associated with, among other things, greater reliance on services, lower unemployment, greater educational attainment, less corruption, lower barriers to entrepreneurship and (the thing it is supposed to proxy) greater capital access. We explore the problems caused by these correlations in Section X below.

Some of the other correlations with “% SEI only” are surprising. For example, it is well-known that self-employment is relatively common in service industries, so one might expect that countries with relatively larger service sectors would have more self-employed households, but it doesn’t seem to be so; Torrini (2005) draws a similar conclusion. It is also well-known, of course, that economic growth leads to greater consumption of services—while the expansion of services may increase the opportunities for self-employment, it may also increase the opportunity cost.

Higher unemployment is associated with higher self-employment, consistent with what Audretsch, et.al. (2005) call the “refugee effect” of unemployment. This correlation is contrary to the regression coefficients found in several panel studies (e.g., Robson and Wren (1999), Robson (2003), Parker and Robson (2004)), suggesting either that the effect will vanish when other covariates are controlled or that the cross-section effect is a poor guide to the time-series effect. Audretsch, et.al. (2005) suggest the latter, arguing for the dominance over time of an “entrepreneurial effect,” by which *increases* in self-employment lead to (lagged) *decreases* in unemployment.

The negative correlation between self-employment and educational attainment is large in absolute value, perhaps surprisingly so, but it suggests again the importance of opportunity cost: a highly educated employee is likely to be a highly compensated employee who may find self-employment correspondingly less attractive.

Fölster (2002) asks the question “Do Lower Taxes Stimulate Self-Employment?” Using the OECD self-employment data, he finds that they do, adducing five arguments: 1) higher taxes reduce savings available to entrepreneurs; 2) higher taxes fund higher unemployment support; 3) higher taxes may be associated with more costly compliance regimes; 4) higher taxes mean more public sector employment; and 5) reverse causation (countries with fewer self-employed people levy higher taxes). Our correlation is consistent with his findings.

The idea that corruption could be associated with self-employment is emphasized by Torrini (2005). We find that a higher Corruption Index is associated with lower self-employment. Torrini speculates that the correspondence between corruption and self-employment results from greater opportunities for the self-employed to evade taxes in a relatively corrupt society. It is worth noting, however, the very close correlation between the Corruption Index and GDP per capita.

Torrini (2005) also suggests that the regulatory environment may affect self-employment. He uses a rather general index of product market regulation. One of its component parts, however, seems directly relevant. It is called “Barriers to Entrepreneurship,” and it is highly *positively* correlated with self-employment in cross-section. Torrini speculates that perhaps these barriers serve mostly to protect small businesses from predatory competition. Again this variable is highly (negatively) correlated with GDP per capita (and, though we don’t show it in the table, with a higher Corruption Index).

Our last variable is the Capital Access Index calculated by the Milken Foundation, and it is very negatively correlated with self-employment. If “capital access” really meant what the name implies, it might be associated with *greater* self-employment, since it is well-known that entrepreneurship is often capital-constrained. However, capital access *as the index measures it* is highly correlated with GDP per capita, leading to higher productivity among employees and a higher opportunity cost of self-employment.

The two columns of results about distributive effects can be summarized with surprising ease, especially if one focuses on the weighted results: **the correlation of a variable with the proportion of the self-employed households in the bottom quintile will be the opposite of the correlation with the prevalence of self-employed households**, that is, a variable that is associated with greater self-employment will be associated with fewer of the self-employed crowded into the bottom quintile (the only exception for the weighted results is for Taxes as % of GDP). Likewise, **the correlation of a variable with the proportion of the self-employed households in the top quintile will be the same as the correlation with the prevalence of self-employed households**, that is, a variable that is associated with greater self-employment will be associated with more of the self-employed crowded into the top quintile (again the only exception for the weighted results is for Taxes as % of GDP). This overall result is consistent with the idea that self-employment is driven by incentives: when a variable (say, unemployment, or corruption) leads to relatively fewer self-employed people being in the bottom quintile and relatively more in the top quintile, then there is greater incentive for people to be self-employed.

X. Adventures with Multicollinearity.

It should by now be obvious why we approached the previous section with a correlation matrix instead of a table of regression coefficients: because the multicollinearity is so high that the regression coefficients are unlikely to be independently meaningful. Table 9 is intended to prove the point. The exercise reported there involves regressing each of the analysis variables on all of the covariates, then “testing down” the regressions until the remaining variables all have a t-statistic of at least 1.20 (a significance level of about 0.25)⁶. The table reports the t-statistics from each of these regressions (because of the wide variety of different metrics for the variables, the coefficients only make sense relative to their standard errors).

In the first two columns, where the analysis variables are measures of the self-employment rate, note that the coefficient on GDP per capita is *positive* in the weighted regressions, and insignificant in the unweighted ones. The coefficient on the unemployment rate is also positive, though the t-statistics are low. These results are contrary to most of the published results, an outcome we attribute primarily to the extraordinary difficulty of sorting out the multicollinearity. The one really robust result seems to be that high corruption is strongly associated with greater self-employment. Note also that in the one instance where Barriers and Capital Access are significant, the coefficients have intuitively appealing signs (higher Barriers of Entrepreneurship are associated with *less* self-employment and greater Capital Access with *more*), rather than the counter-intuitive signs of their zero-order correlations.

The third and fourth columns contain a somewhat larger number of coefficients that meet the (admittedly lax) $|t| > 1.2$ standard. Again the Corruption Index is the most consistently significant variable: greater corruption is associated with less representation of the self-employed in the bottom quintile and greater representation of the self-employed in the top quintile. Educational attainment also comes through as important: as there are more University graduates, fewer of the self-employed make it to the top quintile and more are found in the bottom quintile. A last point is that again the Capital Access variable has the more intuitive sign: greater capital access is associated with *less* representation of the self-employed in the bottom quintile, once other factors are controlled.

The main message of this section is that it is difficult to disentangle the channels by which various variables affect self-employment. For example, while GDP per capita is highly negatively correlated with self-employment, it is unclear what that observation really implies. For example, high GDP per capita is associated with a highly educated population with high opportunity costs of being self-employed. It is also associated with relatively low corruption.

⁶ Mexico and the Slovak Republic had to be removed for the purposes of this exercise, because each lacked data for one variable.

XI. Summary of Conclusions.

Looking at self-employment through the lens of sources of household income generates one observation that is unique, and perhaps surprising: in most of the LIS countries (3/4 of those in the most recent Wave of surveys) **households that combine self-employment income (SEI) with wage and salary income (WSI) outnumber households that rely on self-employment as their sole source of earnings.** The prevalence of this “combiner” phenomenon deserves further study.

As regards the distributive consequences of self-employment, there seem to be three valid generalizations: **1) households with SEI only are overrepresented in the bottom quintile, and households that combine SEI with WSI are underrepresented in the bottom quintile; 2) households with SEI only are underrepresented in the top quintile, and households that combine SEI with WSI are overrepresented in the top quintile; and 3) in countries in which a larger proportion of households earn self-employment income, those households are less overrepresented in the bottom quintile and more overrepresented in the top quintile.** The third generalization is consistent with the idea that reliance on self-employment will be more prevalent when it is associated with a lower probability of a low payoff and a higher probability of a high payoff, but the economic processes that deliver these generalizations have not been extensively studied in a cross-national context.

One might suppose that the institutions of economic integration that developed during the 1990’s, such as the European Single Market and the North American Free Trade Agreement, would generate convergence in both the prevalence and the distributive consequences of self-employment. The data do not consistently support this supposition. Even the limited evidence for convergence is fragile, sensitive to both the sample of countries and the measure of convergence. The principal conclusion is that **cross-national differences in the prevalence and consequences of self-employment are persistent**, and the convergence effects of economic integration do not consistently reveal themselves over a time period as short as a decade.

The stylized fact that self-employment falls with per capita GDP holds up when self-employment is measured using household income, but the interpretation of this stylized fact is confounded by the close correlation between per capita GDP and other variables, both economic and institutional. For example, countries with higher per capita GDP generally have higher educational attainment and lower unemployment, each of which affects the incentives to be self-employed.

Our last conclusion is that Torrini’s (2005) claim that cross-national variation ought to represent identifiable differences in institutions seems to have merit. For example, his innovation in deploying an index of corruption seems to be fruitful in our models, too. It will be hard to calibrate the relative importance of different institutions, however, until there has been sufficient time for there to be substantial time series variation in those institutions.

REFERENCES

- Acs, Zoltan J., David B. Audretsch and David S. Evans. 1994. Why Does the Self-Employment Rate Vary Across Countries and Over Time? Centre for Economic Policy Research Discussion Paper 871.
- Atkinson, Anthony B., Lee Rainwater and Timothy M. Smeeding. 1995. *Income Distribution in OECD Countries: Evidence from the Luxembourg Income Study*. Paris, France: Organization for Economic Co-operation and Development.
- Audretsch, David B., Martin A. Carree, A. Roy Thurik and A.J. van Stel. 2005. Does Self-Employment Reduce Unemployment? Centre for Economic Policy Research Discussion Paper 5057.
- Blanchflower, David G. 2000. Self-Employment in OECD Countries. *Labour Economics* 7:471-505
- Blanchflower, David G., Andrew Oswald and Alois Stutzer. 2001. Latent Entrepreneurship Across Nations. *European Economic Review* 45:680-91.
- Fölster, Stefan. 2002. Do Lower Taxes Stimulate Self-Employment? *Small Business Economics* 19:135-45.
- Gottschalk, Peter and Timothy M. Smeeding. 1997. Cross-national Comparisons of Earnings and Income Inequality. *Journal of Economic Literature* 35:633-87.
- Le, Anh T. 1999. Empirical Studies of Self-Employment. *Journal of Economic Surveys* 13:381-416.
- Mark, Nelson C. and Donggyu Sul. 2003. Vector Estimation by Panel DOLS and Long-Run Money Demand. *Oxford Bulletin of Economics and Statistics* 65:655-80.
- Parker, Simon C. and Martin T. Robson. 2004. Explaining International Variations in Self-Employment. *Southern Economic Journal* 71:287-301.
- Pedroni, Peter. 2000. Fully Modified OLS for Heterogeneous Cointegrated Panels. *Advances in Econometrics* 15:93-130.
- Robson, Martin T. and Colin Wren. 1999. Marginal and Average Tax Rates and the Incentive for Self-Employment. *Southern Economic Journal* 65:757-73.
- Robson, Martin T. 2003. Does Stricter Employment Protection Legislation Promote Self-Employment? *Small Business Economics* 21:309-19.

Sullivan, Dennis and Timothy M. Smeeding. 1997. All the World's Entrepreneurs: The Role of Self-Employment in Nineteen Nations. Luxembourg Income Study Working Paper 163.

Torrini, Roberto. 2005. Cross-country Differences in Self-employment Rates: The Role of Institutions. *Labour Economics* 12:661-83.

Yago, Glenn, Thomas Hall and Michael Harrington. 2000. *Think Locally—Act Globally: Capital Market Restructuring and Sustainable Global Economic Growth*. Santa Monica, California: Milken Institute.

Table 1- Distribution of Households by Source of Non-Farm Earr
Wave III of Luxembourg Income Study (around 1990)

<u>COUNTRY</u>	<u>PERCENTAGE IN EACH GROUP</u>			
	<u>SEI only</u>	<u>SEI>WSI</u>	<u>WSI>SEI</u>	<u>WSI only</u>
<i>Italy</i>	20.2%	5.7%	5.8%	68.3%
Taiwan	16.1%	5.4%	6.1%	72.4%
<i>Mexico</i>	13.1%	5.9%	9.8%	71.7%
<i>Spain</i>	11.3%	4.4%	5.4%	78.8%
Israel	8.1%	6.5%	5.2%	80.1%
UK	7.2%	4.8%	5.3%	82.8%
Switzerland	6.8%	3.0%	4.5%	85.8%
<i>Luxembourg</i>	5.4%	1.8%	10.6%	82.3%
Australia	5.0%	3.7%	4.6%	86.7%
<i>France</i>	5.0%	1.9%	1.7%	91.4%
Denmark	4.0%	3.2%	12.6%	80.3%
Sweden	4.0%	1.6%	10.6%	83.7%
Germany	3.8%	4.1%	4.4%	87.8%
US	3.8%	3.1%	7.8%	85.4%
Czech Rep	3.5%	4.4%	4.6%	87.5%
Netherlands	3.5%	1.6%	2.8%	92.2%
Canada	3.3%	2.9%	8.6%	85.2%
Slovak Rep	2.3%	2.8%	2.4%	92.5%
Finland	2.1%	3.6%	8.1%	86.3%
Norway	1.9%	4.1%	6.1%	87.9%
<i>Russia</i>	1.1%	1.0%	3.3%	94.6%
AVERAGE	6.3%	3.6%	6.2%	84.0%
STD DEVIATION	5.0%	1.5%	2.9%	6.9%
Correlation with SEI only		0.66	0.07	

SEI= Non-Farm Self-Employment Income

WSI= Wage and Salary Income

Country names listed in *italic type* measure

Wage and Salary Income net of taxes

Table 2- Distribution of Households by Source of Non-Farm Earr
Wave V of Luxembourg Income Study (around 2000)

COUNTRY	PERCENTAGE IN EACH GROUP			
	SEI only	SEI>WSI	WSI>SEI	WSI only
<i>Greece</i>	20.4%	7.6%	6.3%	65.7%
<i>Italy</i>	20.2%	7.4%	7.6%	64.8%
<i>Mexico</i>	16.8%	6.1%	13.1%	64.0%
Taiwan	14.3%	7.1%	5.9%	72.7%
<i>Russia</i>	11.0%	4.5%	10.4%	74.1%
<i>Spain</i>	9.2%	6.5%	7.0%	77.4%
Poland	7.8%	3.4%	3.5%	85.3%
<i>Ireland</i>	6.6%	5.5%	8.5%	79.4%
UK	6.4%	4.5%	6.4%	82.7%
Switzerland	5.9%	4.4%	3.4%	86.4%
Germany	5.4%	4.7%	2.5%	87.4%
<i>Estonia</i>	5.3%	1.2%	7.2%	86.3%
Israel	5.1%	6.1%	5.4%	83.4%
<i>Austria</i>	4.7%	3.3%	6.7%	85.3%
<i>Hungary</i>	4.3%	3.8%	5.1%	86.7%
Sweden	4.1%	2.1%	11.5%	82.3%
Canada	3.8%	3.6%	12.3%	80.3%
<i>Belgium</i>	3.4%	2.7%	5.3%	88.6%
US	3.2%	2.5%	7.3%	87.0%
<i>Slovenia</i>	2.7%	3.6%	6.8%	86.9%
Finland	2.6%	3.0%	7.3%	87.1%
<i>Luxembourg</i>	2.4%	1.3%	1.7%	94.6%
Netherlands	2.4%	1.2%	4.0%	92.5%
Norway	2.2%	3.2%	8.6%	86.0%
AVERAGE	7.1%	4.1%	6.8%	82.0%
STD DEVIATION	5.5%	1.9%	2.9%	8.3%
Correlation with SEI only		0.80	0.23	

SEI= Non-Farm Self-Employment Income

WSI= Wage and Salary Income

Country names listed in *italic type* measure

Wage and Salary Income net of taxes

Table 3- Percentage of Each Group in Bottom Quintile
of Overall Distribution of Non-Farm Earnings
Wave III of Luxembourg Income Study (around 1990)

<u>COUNTRY</u>	<u>SEI only</u>	<u>SEI>WSI</u>	<u>WSI>SEI</u>	<u>WSI only</u>
Sweden	70.2%	14.2%	8.9%	19.1%
<i>Russia</i>	64.4%	6.6%	8.5%	20.7%
Denmark	59.6%	5.2%	5.7%	20.9%
Finland	58.1%	13.7%	12.0%	20.1%
Canada	55.5%	13.8%	11.2%	19.7%
UK	52.6%	13.0%	15.3%	17.9%
Netherlands	44.1%	13.0%	17.4%	19.4%
US	43.8%	12.8%	10.7%	20.7%
Switzerland	42.7%	8.5%	10.3%	19.1%
Norway	42.2%	13.5%	7.0%	20.7%
Australia	35.5%	9.5%	5.8%	20.3%
<i>Luxembourg</i>	33.9%	2.5%	8.8%	22.6%
<i>Mexico</i>	33.4%	6.2%	11.0%	20.0%
Czech Rep	32.2%	2.9%	5.1%	21.4%
<i>France</i>	31.1%	1.6%	4.5%	20.1%
<i>Spain</i>	27.0%	7.2%	6.2%	21.2%
Slovak Rep	25.8%	2.8%	5.8%	20.8%
Germany	24.8%	9.0%	4.2%	21.2%
<i>Italy</i>	21.6%	0.9%	1.9%	25.4%
Israel	19.0%	2.9%	5.2%	22.5%
Taiwan	17.6%	5.9%	5.6%	22.8%
AVERAGE	39.8%	7.9%	8.1%	20.8%
STD DEVIATION	15.5%	4.6%	3.8%	1.6%

Overrepresentation shown in bold face

Country names listed in *italic type* measure

Wage and Salary Income net of taxes

Table 4- Percentage of Each Group in Bottom Quintile
of Overall Distribution of Non-Farm Earnings
Wave V of Luxembourg Income Study (around 2000)

<u>COUNTRY</u>	<u>SEI only</u>	<u>SEI>WSI</u>	<u>WSI>SEI</u>	<u>WSI only</u>
<i>Estonia</i>	81.9%	15.5%	9.8%	17.1%
Sweden	71.5%	22.2%	9.1%	18.9%
Canada	63.3%	15.6%	10.7%	19.9%
Finland	60.2%	15.3%	8.8%	19.9%
<i>Austria</i>	59.8%	15.9%	12.6%	18.6%
Switzerland	57.3%	13.3%	11.6%	18.2%
Norway	53.6%	11.3%	9.4%	20.5%
<i>Slovenia</i>	50.3%	9.2%	2.0%	20.9%
Netherlands	45.7%	4.6%	10.2%	20.0%
<i>Russia</i>	46.5%	3.6%	8.3%	18.8%
US	46.4%	9.1%	9.1%	20.7%
UK	44.2%	10.0%	10.8%	19.4%
<i>Belgium</i>	42.3%	3.4%	6.9%	21.2%
<i>Ireland</i>	39.3%	0.5%	5.9%	21.5%
<i>Greece</i>	36.0%	5.1%	4.8%	18.3%
<i>Mexico</i>	35.0%	12.4%	12.9%	18.3%
<i>Spain</i>	34.7%	6.7%	13.9%	20.1%
<i>Italy</i>	31.2%	2.1%	3.9%	22.6%
Poland	25.7%	2.4%	3.5%	20.9%
<i>Hungary</i>	25.7%	6.1%	2.7%	21.4%
Taiwan	23.2%	5.2%	4.0%	22.1%
Israel	22.0%	3.5%	5.4%	22.0%
Germany	20.5%	7.8%	4.5%	21.1%
<i>Luxembourg</i>	13.8%	0.0%	2.8%	20.9%
AVERAGE	42.9%	8.4%	7.7%	20.1%
STD DEVIATION	17.3%	5.8%	3.6%	1.4%

Overrepresentation shown in bold face

Country names listed in italic type measure

Wage and Salary Income net of taxes

Table 5- Percentage of Each Group in Top Quintile
of Overall Distribution of Non-Farm Earnings
Wave III of Luxembourg Income Study (around 1990)

COUNTRY	SEI only	SEI>WSI	WSI>SEI	WSI only
Slovak Rep	28.0%	52.5%	40.0%	18.3%
<i>France</i>	24.4%	53.1%	42.4%	18.7%
<i>Italy</i>	21.1%	51.6%	34.9%	15.7%
Czech Rep	19.9%	50.7%	40.1%	17.1%
<i>Luxembourg</i>	19.4%	54.5%	37.6%	17.0%
Israel	19.0%	45.6%	34.3%	17.1%
Switzerland	19.0%	43.7%	32.0%	18.5%
Germany	18.7%	46.0%	40.1%	17.8%
Netherlands	18.6%	55.5%	28.3%	19.2%
<i>Mexico</i>	17.2%	44.4%	27.6%	17.4%
US	15.0%	34.0%	27.0%	19.1%
<i>Russia</i>	14.3%	71.5%	36.0%	18.9%
Australia	11.7%	37.3%	34.1%	19.0%
<i>Spain</i>	11.5%	47.0%	41.5%	18.2%
Norway	10.6%	36.1%	41.7%	17.9%
Taiwan	10.3%	28.4%	40.6%	19.8%
Canada	9.8%	36.7%	27.8%	19.0%
UK	8.0%	27.1%	19.9%	20.6%
Denmark	5.5%	45.4%	38.5%	16.8%
Finland	4.5%	39.7%	26.6%	18.8%
Sweden	1.2%	16.9%	30.9%	19.6%
AVERAGE	14.7%	43.7%	34.4%	18.3%
STD DEVIATION	6.8%	11.9%	6.3%	1.2%

Overrepresentation shown in bold face

Country names listed in italic type measure

Wage and Salary Income net of taxes

Table 6- Percentage of Each Group in Top Quintile
of Overall Distribution of Non-Farm Earnings
Wave V of Luxembourg Income Study (around 2000)

COUNTRY	SEI only	SEI>WSI	WSI>SEI	WSI only
<i>Luxembourg</i>	40.6%	40.4%	55.0%	18.6%
<i>Belgium</i>	29.4%	68.4%	43.3%	16.7%
<i>Ireland</i>	28.5%	60.0%	32.4%	15.2%
Poland	20.3%	52.4%	40.7%	17.8%
<i>Italy</i>	18.5%	49.6%	34.7%	14.7%
<i>Hungary</i>	17.5%	40.3%	47.8%	17.5%
<i>Mexico</i>	17.1%	34.0%	24.8%	18.4%
<i>Greece</i>	16.9%	40.3%	27.5%	17.8%
Germany	16.7%	46.9%	44.2%	18.1%
<i>Austria</i>	14.0%	53.5%	36.7%	17.5%
Netherlands	13.9%	46.4%	36.2%	19.1%
<i>Spain</i>	13.5%	41.8%	29.4%	18.1%
UK	13.0%	32.3%	30.8%	19.0%
<i>Russia</i>	12.2%	37.3%	26.3%	19.2%
US	12.0%	35.7%	29.9%	18.8%
<i>Slovenia</i>	10.7%	24.1%	39.8%	18.6%
Norway	10.5%	46.5%	31.5%	18.1%
Israel	10.4%	31.9%	37.7%	18.6%
Taiwan	8.9%	30.3%	41.5%	19.2%
Finland	6.9%	35.3%	27.6%	19.2%
Switzerland	6.3%	32.0%	27.3%	20.0%
Canada	6.1%	29.3%	24.3%	19.3%
<i>Estonia</i>	4.0%	24.5%	33.4%	19.7%
Sweden	1.1%	19.4%	28.4%	19.8%
AVERAGE	14.5%	39.7%	34.6%	18.3%
STD DEVIATION	8.7%	11.7%	7.9%	1.3%

Overrepresentation shown in bold face
Country names listed in italic type measure
Wage and Salary Income net of taxes