# Economic Policies and Microeconomic Stability: A Literature Review and Some Empirics

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**ECONOMIC POLICIES AND MICROECONOMIC STABILITY:**
**A LITERATURE REVIEW AND SOME EMPIRICS**

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**By Paula Garda and Volker Ziemann**

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**ABSTRACT/RÉSUMÉ**

**Economic Policies and Microeconomic Stability: A Literature Review and Some Empirics**

The decline in macroeconomic volatility from the 1980s to the onset of the Great Recession did not, in general, translate into more microeconomic stability. While microeconomic volatility can reflect growth-generating processes, such as creative destruction and re-allocation of resources, consumption growth volatility weighs on households' welfare. This study reviews the existing literature on the link between economic policies and economic stability at the firm and household level. Based on firm-level and household-level data for a wide range of OECD countries, it also provides preliminary results on sources and patterns of microeconomic volatility.

*JEL classification*: D12; D22; E32; O43

*Keywords*: Economic policy, volatility, growth, microdata


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**Politiques économiques et stabilité microéconomique : une revue de la littérature et quelques éléments empiriques**

La baisse de la volatilité macroéconomique dès les années 1980 jusqu'au début de la Grande Récession ne s'est pas, en général, traduite par une plus grande stabilité microéconomique. Si la volatilité microéconomique peut traduire des processus générateurs de croissance tels que la destruction créatrice et la réallocation des ressources, la volatilité de la croissance de la consommation pèse sur le bien-être des ménages. Cette étude dresse un panorama de la littérature existante sur les liens entre les politiques économiques et la stabilité économique au niveau des entreprises et des ménages. En s'appuyant sur des données d'entreprises et de ménages couvrant un large éventail de pays de l'OCDE, elle fournit également des résultats préliminaires sur les caractéristiques de la volatilité microéconomique et ses origines.

*Classification JEL*: D12 ; D22 ; E32 ; O43

*Mots clés*: Politiques économiques, volatilité, croissance, micro-données

## TABLE OF CONTENTS

**Boxes**

**ECONOMIC POLICIES AND MICROECONOMIC STABILITY:**
**A LITERATURE REVIEW AND SOME EMPIRICS**


By


Paula Garda and Volker Ziemann[1]


## 1. Introduction

1.      OECD work has increasingly looked at side-effects of growth-promoting policies, in particular on income inequality, the environment and financial balances (OECD, 2013). The potential trade-offs between growth-promoting policies and macroeconomic stability and how these may influence policy recommendations has also been investigated (Sutherland and Hoeller, 2013; Ziemann, 2013).

2.      Endogenous growth models suggest that welfare implications of economic fluctuations are twofold. Besides their direct negative impact on welfare, volatility also affects consumption growth adversely, for instance, due to lower incentives to invest (e.g. Epaulard and Pommeret, 2003; Lucas, 2003; Bloom, 2009). In addition, large output fluctuations can lead to hysteresis effects on entrepreneurship (Congregado et al., 2012) and unemployment (Blanchard and Summers, 1987) with adverse effects on innovation and human capital (Pissarides, 1992) resulting in lower potential growth.

3.      While there is broad agreement that macroeconomic volatility has declined from the 1980s to the onset of the Great Recession, there is much less agreement about a similar decline in individual consumption volatility and thus, *ceteris paribus*, an increase in welfare. Several studies have found that household consumption, earnings and firm sales growth have become more volatile in recent decades, and this even before the onset of the recent crisis. The welfare effects of rising output and employment volatility are potentially very high (e.g. Low et al., 2010).

4.      Yet, the policy focus has long been mainly on growth-enhancing policies without much consideration for possible side-effects on the economic stability at the household and firm level. However, the volatility of sales, earnings and employment has important potential implications for consumption growth, consumption stability and, hence, welfare:

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- The stability of firm sales, as a proxy for value added, affects the stability of employment, wages, capital and entrepreneurial income, all of which are a source of household income (Strain, 2013). On the other hand, firm-level volatility may also reflect desirable creative destruction processes which ultimately increase productivity, income and welfare.

- Earnings stability affects the level of individual consumption via the inter-temporal budget constraint by determining the level of precautionary savings (Banks et al., 2001). In addition, under borrowing and wealth constraints, earning shocks may be transmitted to consumption and increase its volatility (Blundell et al., 2008).

- Employment instability puts a drag on potential growth and hence lowers individual consumption and welfare, e.g. due to hysteresis effects (Pissarides, 1992). Additionally, it induces a disutility related to job searching (Ljungqvist and Sargent, 1998).

5.      Against this backdrop, this paper reviews the evidence of how economic policies affect economic stability at the household and firm level. It is organised as follows. Section 2 presents developments in aggregate and idiosyncratic volatility of output, income and consumption and provides cross-country comparisons. Section 3 discusses firm and household-specific determinants of macro and microeconomic stability. Section 4 examines how economic policies and institutions affect fluctuations at the firm and household level. The final section concludes. Appendices 4 and 5 provide details on the methodology, data and findings of the various studies in the literature.

**2. Aggregate and idiosyncratic volatility: the stylised facts**

6.      Empirical studies using firm and household-level data seem to suggest that the decline in aggregate output volatility prior to the Great Recession is due to domestic and international diversification rather than due to declines in the volatility of individual consumption and individual firm output. This section reviews the methodologies available to measure these volatilities, surveys existing findings from the literature and presents evidence on the level and trends of consumption, earnings, employment and sales volatilities[2] in a cross-country setting.

*2.1. Firms*

7.      Total sales volatility can be decomposed into three components: i) individual firm level sales volatilities, ii) the weighting scheme and iii) the covariance structure of sales growth across firms. All three elements can vary over time and a decrease of aggregate volatility does not necessarily mean that firm level sales volatility has declined since structural changes, for example a shift from more volatile to less volatile sectors or declining covariances may compensate an increase in firm level sales volatility.

8.      The conduct of cross-country volatility analyses at the micro-level is constrained by the limited availability of harmonised firm level data with a sufficiently long history. In order to shed some light on trends across time and across countries, Figure 1 makes use of the OECD's Structural Analysis (STAN) database that has a fairly long history for 32 countries but is an industry database rather than a firm-level database. The bars illustrate the contributions to the change in aggregate sales volatility of sector volatilities, sector weights and co-variances across sectors through 2007 with respect to 1978 or the earliest available year. The results confirm previous findings that aggregate volatility has declined for most countries.

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2.      Throughout the paper, the notions of *volatility* and *stability* refer to volatility and stability of *growth rates*, not of levels.

9.      The findings in Figure 1 further suggest that most of the decline in aggregate volatility can be attributed to declines in correlations between the sector sales and declines in sector level sales volatilities (see Table A1 in Appendix 1 for details on sector volatilities). This is consistent with findings in Stiroh (2009) who decomposes the variance of aggregate US output growth into sector variance and covariance components including 35 industries and finds that most of the decline in aggregate volatility is related to declines in covariances though sector volatilities also declined.

10.     Composition effects, mainly structural shifts from the more volatile manufacturing to services sectors (see Table A2 in Appendix 1 for details on sector shares), hardly contribute to the change in aggregate volatility. While manufacturing indeed exhibits the highest volatilities, this sector is also very weakly or even negatively correlated with services and the public sector, which reduces the impact of changing weights on total volatility. Also, while the contribution of the manufacturing sector outweighs that from other sectors (Figure 1), firm-level volatility has declined relatively more on average across service sectors (Table A2).[3]

**Figure 1.  Contribution to change in total sales volatility before the crisis**
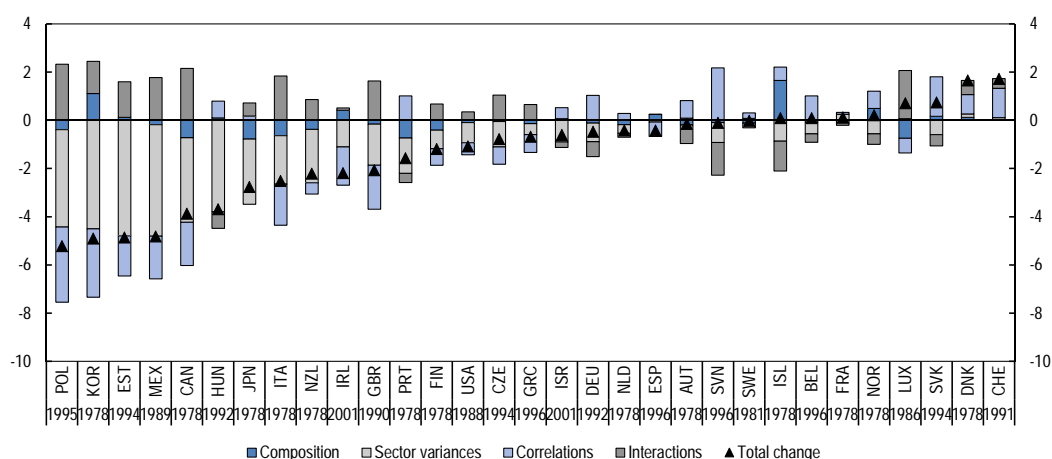


*Note:* Standard deviations are calculated over 5-year windows of nominal sales growth rates. The bars indicate contributions to the difference between standard deviations calculated over the 5-year window ending in 2007 with respect to standard deviations calculated over the 5-year window starting at the year indicated below each country (1978 or earliest available). Contributions are simulated based on $\sigma^2 = \omega * \text{diag}(\sigma_i) * C * \text{diag}(\sigma_i) * \omega'$ with $\omega$ the sector shares, $\sigma_i$ the vector of sector standard deviations and $C$ the sector correlation matrix.

*Source:* OECD STAN Database (ISIC Rev. 3 version).

11.     Sector output volatility could then be broken down into idiosyncratic firm level volatilities and the covariance between the firm level sales weighted by their respective shares. Unfortunately, the Secretariat has not yet identified any multi-country firm level database with sufficient history that allows investigating these features on a cross-country basis. Based on US and Canadian firm data, Comin and Mulani (2006) find that the entire decline in aggregate volatility is driven by declines in covariances between firm sales growth rates rather than declines in individual firm-level volatilities.

12.     Similarly, Thesmar and Thoenig (2011) find opposing trends for aggregate and firm level volatilities for French firms. As for German firms, Buch et al. (2009b) find that unconditional volatility has

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3.      Using a longer sample for the United States, Carvalho and Gabaix (2013) find that the initial decrease in aggregate volatility is driven by a shift away from the more volatile manufacturing sector.

sharply decreased at the beginning of the 1980s and remained stable thereafter, while conditional volatility[4] has slightly increased over the period 1971-2005.

13. On the other hand, Davis and Kahn (2008) argue that only publicly traded US firms' sales became more volatile while the volatility of privately held firms' sales and employment declined in line with aggregate output. The authors argue, in line with Fama and French (2004), that the increase in volatility for publicly traded firms is due to a selection bias as the characteristics of firms (risk profile, age, etc.) changed over time.[5]

14. Gabaix (2011) shows that the standard diversification argument that claims that idiosyncratic shocks to firms do not affect aggregate volatility does not hold if firm-size distributions are fat-tailed since it invalidates the central limit theorem. Accordingly, idiosyncratic shocks to big firms affect aggregate volatility. Carvalho and Gabaix (2013) show how idiosyncratic shocks hitting large interconnected firms can propagate through the network and affect other firms and thus aggregate volatility. Similarly, Acemoglu et al. (2012) demonstrate that increasing inter-sectoral linkages may lead to the propagation of idiosyncratic shocks beyond the downstream sectors and contribute to aggregate fluctuations. The rate of decay of aggregate volatility depends on the network structure. In a subsequent paper, Acemoglu et al. (2013) develop a model which highlights the predominant role of network structures in determining the likelihood of deep recessions. Based on the example of Japan, Amiti and Weinstein (2013) demonstrate that this mechanism is particularly relevant in highly concentrated banking sectors where bank-supply shocks have large effects on firm-level investment. Conversely, Kelly et al. (2013) illustrate that big firms with a well-diversified network of customers are less affected by demand shocks.

15. Figure 2 illustrates firm-level sales volatility across a wide range of countries (see Box 1 for coverage, methodology and references). The results show that average volatility exceeds median volatility in all countries which hints at a non-symmetric right-skewed distribution of sales volatility. The ranking of the countries is not very sensitive to the choice of the measure of central tendency. In most countries, the sales-weighted average is much closer to the median than the average, which suggests that small firms are more volatile than big firms. Further, emerging and most Eastern European countries exhibit the highest sales volatilities while some slow-growing Continental European countries host the least volatile firms, which suggests a positive cross-country correlation between (potential) growth and volatility.



**Figure 2. Sales growth volatility by country**
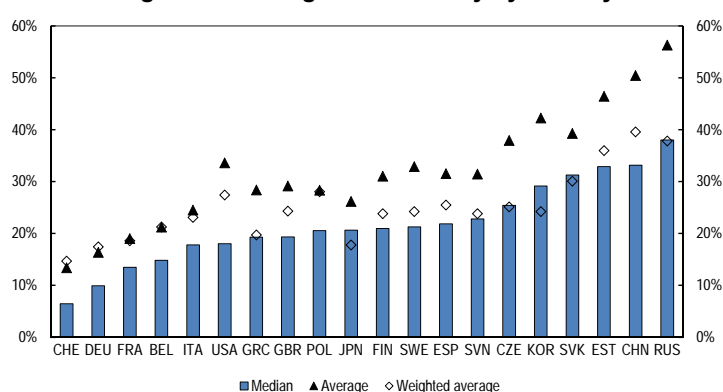
*Note:* Firms with non-erratic sales movements over 2004-09 are considered (see Appendix 2).

*Source:* ORBIS database.

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4. Conditional volatility refers to the standard deviation of the residuals obtained from regressing firms' growth rates on unobserved and macroeconomic factors following Pesaran (2006).

5. Firm characteristics will be discussed in detail in Section 3.1.

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**Box 1. Measuring firm-level volatility**

Firm level volatility is generally assessed through the volatility of nominal sales or employment growth. For the latter, its *raison d'être* is rather straightforward as employment fluctuations, together with fluctuations in the wage rate, determine the stability of employees' earnings and exert therefore an influence on welfare (see Section 2.3). The use of nominal sales as the measure of output or production is problematic, however. First, sales include intermediate consumption which, depending on the type of activity and input prices, may introduce a bias not only on size and growth measures but also on the volatility measure. However, data on value added are much scarcer, which may explain why the bulk of the literature uses sales as a proxy for value added. Second, nominal volatility may be driven by volatile prices. Depending on the research question, sales may be deflated by using industry-level or economy-wide price indices. The question is whether the stability of a firm is better assessed by real or nominal volatility. Most of the literature focusses on nominal sales.

Most empirical studies define sales and employment volatility as the standard deviation of growth rates over 5- or 10-year rolling windows (e.g. Buch et al., 2009a or Comin and Mulani, 2009). Buch et al. (2009b) calculate conditional volatility as the standard deviation of residuals obtained from growth regressions. All these approaches require more or less long time series for firm data. Alternatively, some authors define volatility as the time series of absolute values of these residuals (e.g. Thesmar and Thoenig, 2011 or Correa and Suarez, 2009).

Cross-country firm-level databases are scarce. Recent OECD research has explored the ORBIS database that covers private business sector firms of a wide range of OECD and G20 countries (see Gal, 2013 for an overview). Variables include operating turnover, which is a proxy for sales, value added, earnings, the number of employees, total labour costs and the firm's incorporation year. The coverage depends very much on the variable of interest with employment and turnover being the most widely available variables (see Table A.3 in Appendix 2). Indeed, the total loss of data runs to 58% when using value added instead of sales with no value added data available for US firms. The empirical analysis throughout this paper, as widely done in the literature, will therefore focus on sales and employment volatility.

In order to compute standard deviations over a window of growth rates, i.e. the standard volatility measure, at least 5 or 10 years of consecutive growth rates are needed for each firm. Appendix 2 shows that the availability of data in the ORBIS database is very different across countries and sometimes poor. In an attempt to cover as many firms and as many countries as possible, this study will concentrate on growth rates over the period 2005-09. 20 countries provide a sufficient number of firms (>1000) over this window. So as to avoid biased results due to erratic movements in the data, firms with employment or sales multiplied or divided by a factor larger than 10 from one year to another are excluded from the final dataset. Appendix 2 gives the number of retained firms and the incidence of outliers per country.

One drawback of this approach is that only incumbent firms are included in the database. First, as discussed in Gal (2013) this reduces the representativeness with respect to firm size and age, the degree of which is likely to vary across countries and time. Section 3 reviews the evidence that such firm characteristics exert a substantial impact on firm-level volatility and proposes a methodology to circumvent the representativeness bias when comparing firm volatilities. Second, a framework that does not take entries and exits into account when measuring firm volatility seriously limits the scope for investigating the interplay between firm and household-level dynamics.

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## *2.2. Employment*

16.      The general conjecture is that job stability, as measured by tenure and long-term relationships, has been declining in most OECD countries, although the actual empirical evidence is scarce. Evidence for France, Germany and the United Kingdom confirms that the risk of involuntary job loss has increased over time (Givord and Murin, 2004; Bergemann and Mertens, 2004; Booth et al., 1999). In contrast, Brochu (2013) observed sustained increases in job stability in the 1990s in Canada. Finally, Faberman (2012) shows that rates of job creation and job destruction in the United States have experienced sharp declines in their volatilities during the Great Moderation.

17.      Figure 3 illustrates employment growth volatilities using the ORBIS database. Here, the ranking of the countries very much depends on the measure of central tendency used. China, for instance, yields a median employment volatility of 0 while average volatility is close to 10% and sales-weighted average volatility even close to 20%. This suggests that employment growth of small firms in China is less volatile than that of big firms, while in most other countries the opposite holds true. As for sales growth volatility,

average volatilities are generally substantially larger than median volatilities, which highlights the presence of non-symmetric, right-skewed volatility distributions.

**Figure 3. Employment growth volatility by country**
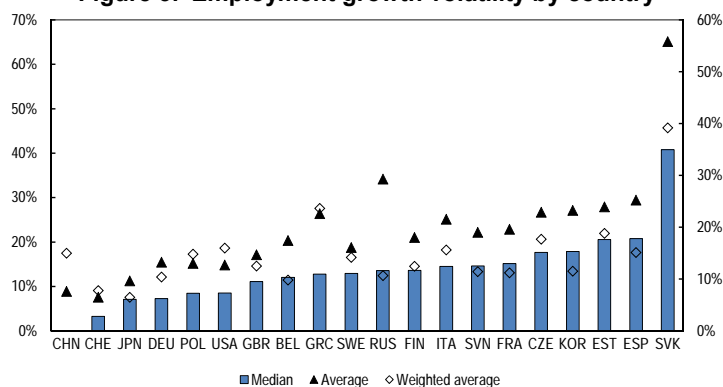


Note: Firms with non-erratic employment movements over 2004-09 are considered (see Appendix 2).
*Source:* ORBIS database.

18.     Figure 4 shows average flows into and outflows from unemployment.[6] Higher average levels of worker turnover are associated with more dynamic labour markets. The average level of unemployment inflow and outflow rates varies substantially across countries. The figure suggests that the English-speaking, Nordic and Continental European countries can be grouped together. The English-speaking and Nordic economies display high exit rates from unemployment, while the Continental European economies exhibit much lower rates. Similarly, unemployment inflow rates also vary considerably across countries. The English-speaking and Nordic countries exhibit inflow rates above 1.5% at a monthly frequency, while these rates are between 0.5% and 1% among the Continental European economies.[7]

**Figure 4. Inflows into and outflows from unemployment**
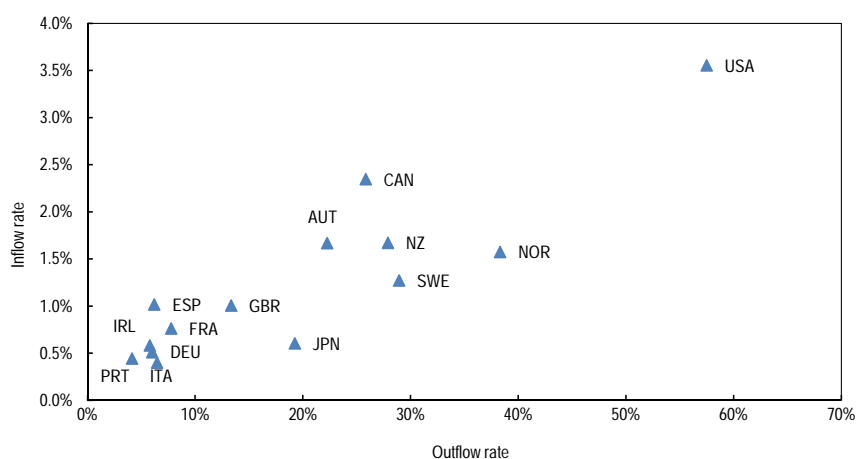


Note: Average of monthly in- and outflow rates from and to unemployment. The starting year varies between 1968 (for the United States) and 1986 (for New Zealand and Portugal). For all countries, the data end in 2009.

*Source:* Calculations based on data by Elsby et al. (2013).

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6.      Elsby et al. (2013) uses data on the number of unemployed and the duration of unemployment to measure annual averages of monthly in- and outflows from unemployment for several OECD countries.

7.      Austria is an exception as it exhibits higher rates than the other Continental European countries.

19.        Countries that are characterised by low worker turnover rates are sometimes called "sclerotic" (see for example, Bentolila and Bertola, 1990, Blanchard and Galí, 2010 and Blanchard and Simon, 2001), a concept often associated with the more regulated labour markets of most European countries. Gartner et al. (2012) show that while Germany has lower labour turnover than the United States, employment is more volatile at the aggregate level, which is related to higher excess churning rates due to fixed-term contracts (Centeno and Novo, 2012).

20.        A previous OECD study (Employment Outlook, 2009) shows that there is a significant and sizeable negative correlation between the level of the flows and their cyclicality. This suggests that more flexible labour markets may indeed be better equipped to deal with business-cycle shocks to labour demand than labour markets with low turnover. Both types of flows can contribute differently to the unemployment dynamics. In the majority of OECD countries, changes in the outflow rate are more important than changes in the inflow rate in explaining cyclical changes in unemployment.

21.        However, there are important cross-country differences. While in Denmark, Ireland, Japan and Sweden the cyclical variation in inflow and outflow rates are almost equally important in explaining cyclical changes in unemployment, in Belgium, France, Germany, Greece, Norway and Portugal, the variation in outflows is somewhat more important than the variation in inflows. In the five English-speaking countries, as well as Spain, changes in the outflow rate appear to be by far the most important driver of changes in the unemployment rate. However, Elsby et al. (2013) show that among the English-speaking economies there is an approximately 15:85 inflow/outflow split of the unemployment variation, while for Continental European and Nordic countries, the split is more even (45:55).

22.        In order to investigate employment dynamics, it is necessary to take job-to-job transitions into account (Figure 5). While for the unemployed, a more dynamic labour market provides better access to jobs, more frequent job-to-job transitions can reflect better career opportunities for workers. Papageorgiou (2013) argues that job turnover may be induced by the acquisition of knowledge with respect to the worker's comparative advantage. In this case, job-to-job fluctuations also reflect better skill matches which increases the worker's productivity and earnings. High earnings and employment volatility may go hand in hand with higher income, for instance via bonus payments or leaving allowances.

23.        On average, about 60% of all hires in one year concern workers that were in employment at the beginning of the year (job-to-job transition). Even after controlling for industry structure, firm and worker characteristics, these flows vary from country to country suggesting an important role for policies and institutions (OECD, 2009).

**Figure 5. Job-to-job, jobless-to-job and job-to-jobless flows**
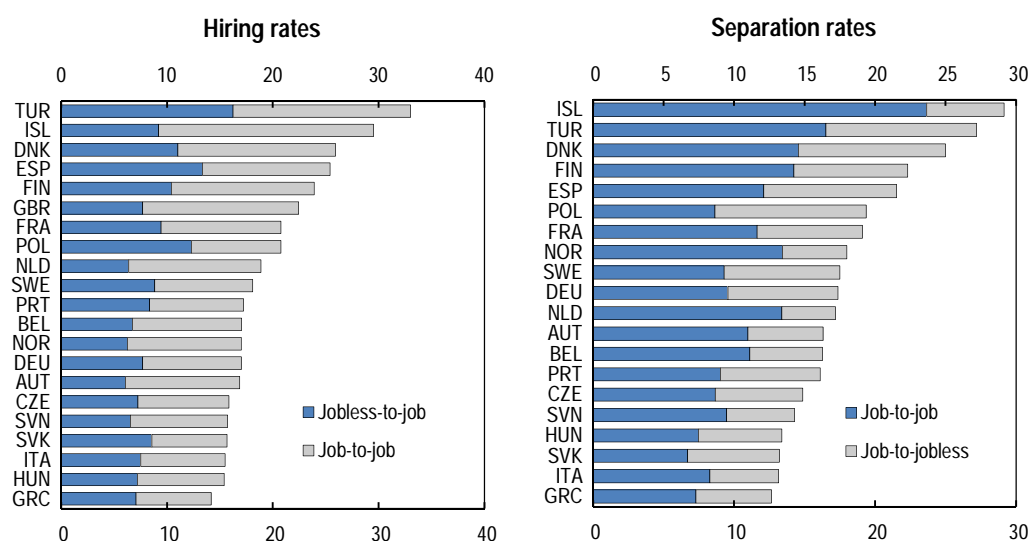


Note: Country average rates for 2000 to 2007 are expressed in percentages and adjusted for industry composition.
*Source*: Employment Outlook (2010).

## 2.3. Household earnings, income and consumption

24.      Earnings instability has been found to be closely linked to employment dynamics and the worker-employer relationship. Strain (2013) finds that volatile firms, defined as having volatile employment, have also more volatile labour earnings in particular at the low wage end. Comin et al. (2009) find a robust relationship between the instability of sales and employment of a firm and the instability of the average earnings paid by that firm, implying that firms pass instability onto workers in the form of more volatile earnings.

25.      In most countries, aggregate consumption volatility has been declining, in line with aggregate output volatility (Stock and Watson, 2003). However, when studying the welfare implications of consumption volatility, the standard assumption of risk averse and heterogeneous consumers in an economy requires looking at household-level consumption.

26.      Most available studies on the evolution of household consumption volatility over time concentrate on the United States. In particular, Davis and Hahn (2008) find that the decline in the volatility of aggregate real activity before the crisis, the coincident decline in firm-level employment volatility and job-loss rates, have not translated into sizable reductions in income uncertainty and consumption volatility for households. Gorbachev (2011) even finds that the mean volatility of household food consumption has increased between 1970 and 2004 and that the increase was much more pronounced for households headed by poorly educated individuals.

27.      Due to limited data availability, studies on consumption volatility are scarce.[8] The bulk of the literature has focussed on examining the volatility of earnings and income at the household and individual level. Changes in earnings and income volatility are associated with changes in risk and uncertainty, although the connection depends on whether these changes in earnings or income have been anticipated. If

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8.      There is a growing literature on consumption inequality (see for example, Jappelli and Pistaferri, 2010 for Italy, Blundell and Etheridge, 2010 for the United Kingdom), but even if both concepts are related, they are not the same. While inequality deals with the cross-section of individuals, volatility accounts for inter-temporal changes for each individual.

ECO/WKP(2014)11

anticipated, prudent households would respond to an increase in uncertainty by accumulating precautionary savings, i.e. by reducing their current consumption. Increased uncertainty also affects the purchase of durable goods (especially those that are difficult to re-sell), affecting consumption and hence household welfare.

28.     On the other hand, earnings changes may be the result of voluntary decisions by households or individuals. However, even if earnings changes are involuntary, the extent to which they affect household welfare will depend on the extent to which household consumption is shielded against earnings shocks *via* the tax and transfer system, insurance markets and the labour supply and savings responses of households themselves. In any case, most studies have found evidence for only partial insurance of income shocks (for example, Blundell et al., 2008, Attanasio and Davis, 1996, Krueger and Perri, 2006), with the consequence that income changes cannot be completely offset and thus affect consumption and household welfare.

29.     Jappelli and Pistaferri (2010) document that there is considerable empirical evidence that individual consumption reacts to anticipated income increases and that liquidity constraints are an important driver for the failure of inter-temporal consumption smoothing. Another finding is that, at least in the United States, consumers do not revise their consumption fully in response to permanent shocks which suggests that precautionary savings and additional insurance provided by government welfare programmes, family labour supply, or family networks play an important role in shaping consumption volatility.

30.     The research on labour earnings and disposable income instability is concentrated on the United States (Appendix 4), but there is a lot of disagreement depending on the data set used, the methodology applied, and the time period covered. Most studies have focused on men's earnings volatility trends, mainly because female labour market behaviour has changed a lot during the past decades and because men's earnings have a higher share in household earnings. The literature agrees that men's earnings volatility has increased during the 1970s, but then levelled off somewhat through to the early- to mid-1980s or fell slightly, but there is no consensus about what happened thereafter (Celik et al., 2012, Shin and Solon, 2011, Dynan et al., 2012b and Dahl et al., 2011).

31.     Other studies disaggregate income into its permanent and transitory components and measure earnings instability as the variance of the transitory component of earnings (Gottschalk and Moffitt, 1994, 2009 and Moffitt and Gottschalk, 2012). According to the papers that use the US Panel Study of Income Dynamics, men's earnings instability rose sharply in the late 1970s and early 1980s, and then stabilised at this higher level, before it increased again during the recent crisis. In contrast, Sabelhaus and Song (2010), who use social security earnings data, imposing enough structure on the stochastic process to identify age and cohort effects, show that different approaches of decomposing earnings growth into permanent and transitory components suggest a decline in the fluctuation of both components.

32.     Few studies have analysed how much of earnings volatility is due, respectively, to earnings per hour or hours worked volatility. For the United States, papers that have shown that there has been a rise in the volatility of earnings, have attributed this increase to greater volatility both in earnings per hour and hours worked (Dynan et al., 2012b, Gottschalk and Moffitt, 2009).

33.     Finally, most studies have found that household disposable income volatility has increased in the United States (Dynan et al., 2012b; Winship, 2009; and Winship, 2011) suggesting that the Great Moderation did not happen at the household level.[9] The increase is due to the higher volatility of both labour earnings and transfer income, together with a reduction of the stabilizing effect of transfer income

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9.      One notable exception is Dahl et al. (2011) who use administrative data and find little change in household disposable income volatility.

on earnings, and a small increase in the volatility of capital income. While women's earnings volatility has become lower, men's earnings volatility increased with the latter dominating since men earn more than women on average.

34.    Increases in earnings instability have been found in Canada (Baker and Solon 2003; Beach et al. 2003; Beach et al. 2010; Ostrovsky, 2010) and the United Kingdom (Dickens, 2000). On the other hand, Cappellari and Jenkins (2013) present evidence that earnings volatility in the United Kingdom has declined slightly for both men and women over the period 1992-2008. The authors also show that employment volatility has significantly declined over the same period. Giesecke et al. (2011) find increasing earnings volatility in Germany which was driven by the permanent earnings component.

35.    Cross-country evidence suggests that earnings volatility has increased over time in the United States and Germany and declined in Korea (Venn, 2011). In the United Kingdom, recent levels of earnings volatility are much the same as those in the early 1990s, following a large increase in volatility in the late 1990s. Sologon and O'Donoghue (2011) analyse the trends in earnings stability in European countries using the European Community Household Panel during the period 1994-2001, and find evidence of two country clusters: earnings stability trended down in Denmark, Finland, Austria, Belgium, Germany, Ireland and Italy, while trending up in the Netherlands, France, the United Kingdom, Spain, Portugal and Greece.

36.    Using industry level data, Buch (2008) finds that the unconditional volatility of labour and capital income, which is mainly driven by common unobserved and observed macroeconomic factors, has declined in the 11 industrialised countries analysed, reflecting the decline in aggregate volatility. However, the conditional or idiosyncratic volatility (see Box 2 for a definition of the measure) shows no marked trend over time. Capital owners are more exposed to idiosyncratic risk than workers.

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**Box 2. Measuring household-level volatility**

Two measures to measure earnings volatility are widely used. The first is based on the decomposition of earnings changes into those that are permanent and those that are temporary or transitory. The variability of the transitory component has been termed *earnings instability*. The second measure uses year-to-year changes in overall earnings, and is referred to as *earnings volatility*. Earnings instability requires complex time-series models, while earnings volatility uses far simpler measures based on individual or cross-sectional variation in earnings. Several authors argue that overall measures of earnings volatility are more useful when examining earnings risk because both permanent and transitory changes in earnings can affect household welfare (e.g. Shin and Solon, 2011; Dynan et al., 2012b). Three main approaches to estimating *earnings volatility* have been developed, all of which require longitudinal data on earnings for individuals:

- *Time-series methods* (e.g. Hällsten et al., 2010; McManus and DiPrete, 2000; Beach et al., 2010): earnings volatility is calculated for each individual as the standard deviation of earnings or earnings changes over several consecutive periods (typically 5-8 years). An overall measure of earnings volatility for a country or sub-group is then calculated as the average of the individual standard deviations.

- *Cross-sectional methods* (e.g. Shin and Solon, 2011; Dynan et al., 2012b; Ziliak et al., 2011): earnings volatility is measured as the cross-sectional variance or standard deviation of year-to-year earnings changes. The idea is that higher earnings volatility should appear as a higher dispersion of year-to-year changes.

- *Categorical methods* (e.g. US Congressional Budget Office, 2007; Dynan et al., 2012b): an individual is defined as having volatile earnings if she experiences a large increase or decrease (usually between 20-30%) in earnings from one year to the next. An overall measure of earnings volatility can then be calculated as the proportion of workers in a particular country or sub-group with volatile earnings.

Cross-sectional and categorical methods are less data-intensive, while time series methods require long time series data for each individual. On the other hand, they are more sensitive to measurement error. Finally, other measures of volatility are the *conditional* and *unconditional* volatility. These are part of the time-series methods described above. The idea of the *conditional* or idiosyncratic measure is to abstract from observed and unobserved macroeconomic

factors, whereas the *unconditional* volatility additionally captures macroeconomic factors.

All measures can be applied to different definitions of earnings and income.

| Labour earnings and self-employment income (Head of household) | Household gross labour earnings | Household market income | Household gross income | Taxes |
|---|---|---|---|---|
| Labour earnings and self-employment income (other members) | Capital income | Transfers | | Household disposable income |
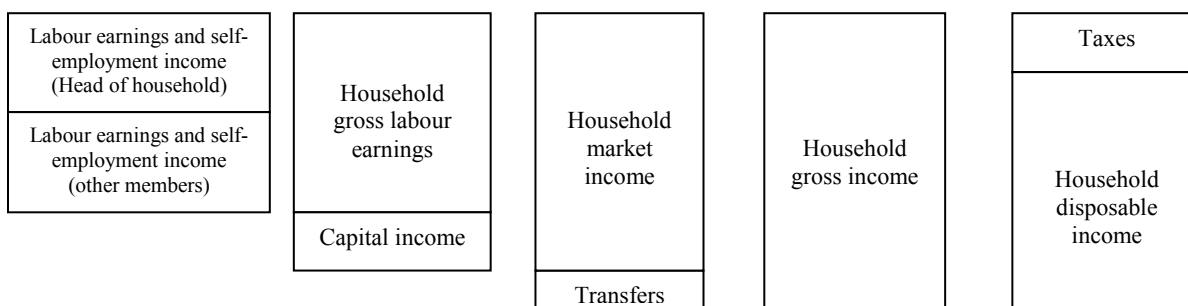
The analysis in this paper uses household panel data. The primary source is the European Union Survey of Income and Living Conditions (EU-SILC). This database collects comparable multidimensional micro-data on: income, poverty, social exclusion, housing, labour, education, and health. The EU-SILC is a rotating panel in which households are followed for a maximum of four years. These longitudinal files (pertaining to individual-level changes over time) are available since 2005 for a small number of countries, but are only available from 2007 for 26 European countries.

Given the short time period covered one can only estimate earnings volatility with cross-sectional or categorical methods. This paper uses categorical methods, but in future analysis longer samples will allow the use of cross-sectional methods. Venn (2011) shows that both methods give very similar results in terms of the incidence of earnings volatility.

The primary variable of interest is annual gross labour earnings, which includes self-employment income. Percentage changes in earnings from one year to the next are calculated as an arc-percentage. That is, the percentage change in earnings is equal to earnings in one year minus earnings in the previous year, divided by the average of the absolute value of earnings for the two-year period. Nominal changes are adjusted for inflation using annual consumer price inflation data from the OECD Main Economic Indicators database. Workers are defined as having volatile earnings if they have at least a 20% real increase or a 20% real decrease in gross labour earnings from one year to the next. Workers who have no gross labour earnings in either year examined are excluded from the analysis. Finally, the analysis is also extended to analyse the impact on household disposable income, and its sources: other household member's labour market income, capital income and tax payments and social transfers.

37.     Figure 6 uses the EU-SILC database and shows the incidence of earnings volatility using the categorical method, i.e. the proportion of workers with year-to-year changes above 20% or below -20% in real gross labour earnings. Changes in earnings can be broken down into changes in earnings while remaining in full time work for the full year for salaried and self-employed workers, changes due to the variability in hours worked and employment while working part-time, and changes due to exit or entry into employment in any of the two years.[10]

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10.     All numbers refer to workers aged between 25 and 59 years old, and exclude students, disabled and retired people. This is to avoid results being driven by young people entering the labour market and old workers moving into retirement.

**Figure 6.  Volatility of labour earnings**
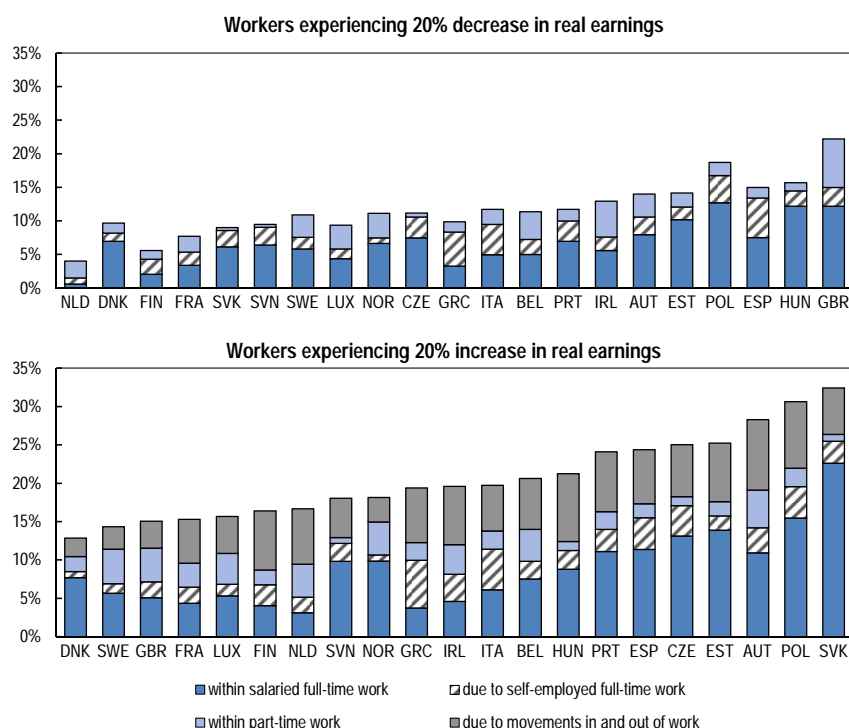
Workers experiencing 20% decrease in real earnings



Workers experiencing 20% increase in real earnings



■ within salaried full-time work          ▨ due to self-employed full-time work

■ within part-time work          ■ due to movements in and out of work

*Note:* Percentage changes in earnings are calculated as the arc percentage change, i.e. the difference in earnings between two years, divided by the average of the absolute value of the two years.[11] The numbers show the average incidence of large increases or decreases for each country for the years 2007 to 2010. Only workers who worked at least one month over the 2 years are considered. Full-time work refers to workers having been in full-time employment for 12 months during the income reference year. Movement in and out of work includes all workers that went out or in employment in at least one of the two years.

*Source:* Calculations based on EU-SILC.

38.        Analysing the overall incidence of earnings volatility, i.e. the sum of large increases and decreases, earnings volatility is highest in the Poland, Austria, and Spain. On average, large decreases in earnings are less common than large increases, but countries with many (few) workers experiencing large increases also tend to have many (few) workers with large decreases, both in full-time and overall earnings.

39.        Figure 7 analyses the volatility of earnings across the distribution of gross earnings. Large decreases in earnings are most common in the lowest quartile of income and are usually due to people becoming unemployed; in the highest quartile they are less common and mainly occur within full time work. Similarly, large increases in earnings in the lowest quartile of the income distribution are mostly due to movements in and out of employment, while large increases in earnings within full time work explain the changes in the highest quartile.

---

11.        The denominator takes the absolute value of each year in order to allow for a symmetric measure of changes and allowing for zero and negatives values. This measure varies between -200 and 200 percentage change between the two years by construction.

**Figure 7. Volatility across the labour earnings distribution**
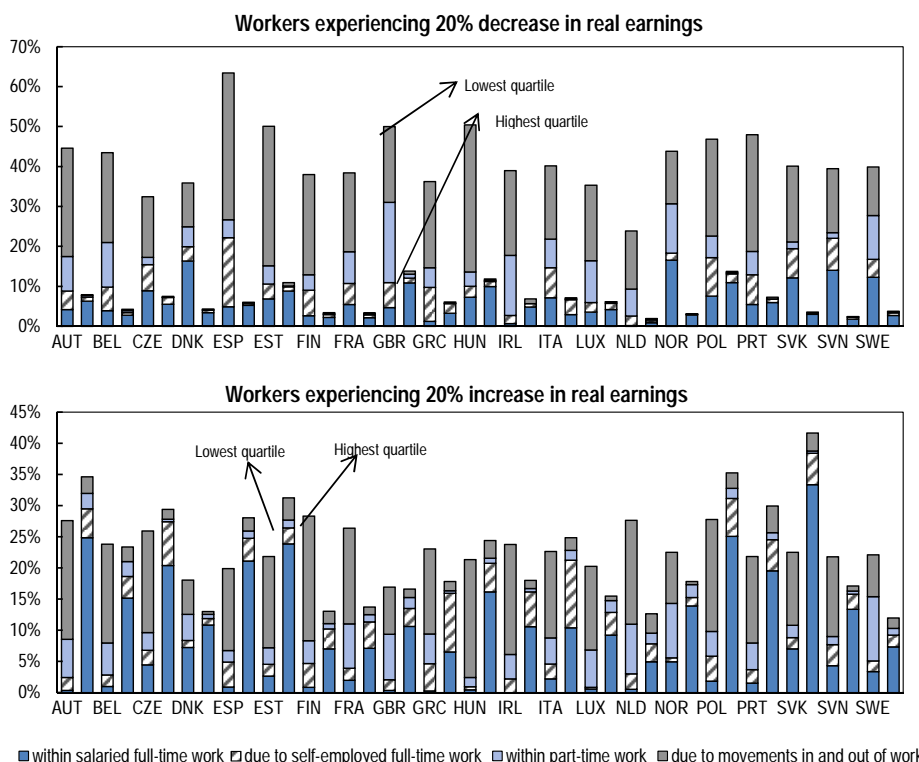


**Workers experiencing 20% decrease in real earnings**



**Workers experiencing 20% increase in real earnings**

■ within salaried full-time work  □ due to self-employed full-time work  ■ within part-time work  ■ due to movements in and out of work

*Note:* Percentage changes in earnings are calculated as the arc percentage change, i.e. the difference in earnings between two years, divided by the average of the absolute value of the two years. The numbers show the average incidence of large increases or decreases for each country for the years 2007 to 2010. Full-time work refers to workers having been in full-time employment for 12 months of the income reference year. Movement in and out of work includes all workers that went out or in employment in at least one of the two years.

*Source:* Calculations based on EU-SILC.

## 3. Non-policy determinants of stability

40.        Before analysing the impact of economic policies and institutions on microeconomic fluctuations, it is worthwhile to recall some characteristics of households and firms that potentially drive volatility. Standard examples of such characteristics are the size and age of households and firms or financial and trade openness, though some of these features may be endogenously caused and driven by policy.

### 3.1. Firm and household characteristics

#### 3.1.1. Firms

41.        Thesmar and Thoenig (2011) find that publicly traded firms in France exhibit more volatile employment growth than privately held firms. Their simple model suggests that the difference stems from different exposures and incentives with respect to international capital markets and stock market participation. On the other hand, Davis et al. (2007) argue that the increase in average sales volatility of publicly traded US firms simply stems from a selection bias. Indeed, listed firms are generally younger than privately held firms and newly listed firms exhibit greater volatility. They find that accounting for the date of the actual listing accounts for two-thirds of the trend increase in sales volatility of listed firms.

42.        Fama and French (2004) report that the number of new listings has substantially increased over time. They argue that decreases in the cost of equity allowed more firms to enter. Yet, the distribution of total asset growth of young firms is more right-skewed (high proportion of fast growing firms) while the profitability distribution is more left-skewed (high proportion of low profitability firms), which led to a decline in survival rates and increased firm-level volatility. While the trend of the number of new listings has been reversed over the last decade, profitability of IPO's, in particular in the case of small firms, has further decreased (Gao et al., 2013). It is thus important to control for firm age and ownership when comparing firm sales and employment volatilities across countries. Empirical results based on the ORBIS dataset confirm these findings. Sales and employment growth rates are more volatile for younger firms (Figure 8).

**Figure 8.  Sales and employment volatility by firm age**
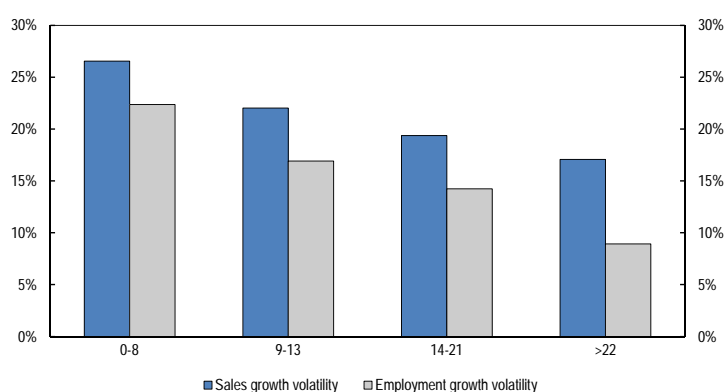


*Note:* Standard deviations of growth rates between 2005 and 2009 by age quartile are shown. 20 countries are covered and outliers excluded (see Appendix 2). The results are robust to the exclusion of individual countries.

*Source:* ORBIS firm-level database.

43.        Different levels of volatility may also reflect different growth regimes. Figure 9 suggests that volatility does indeed depend on growth, the relationship being u-shaped. Fast-growing firms as well as firms with declining sales are both likely to take more risky decisions than firms with moderate growth rates.

**Figure 9.  Sales and employment volatility by average growth**
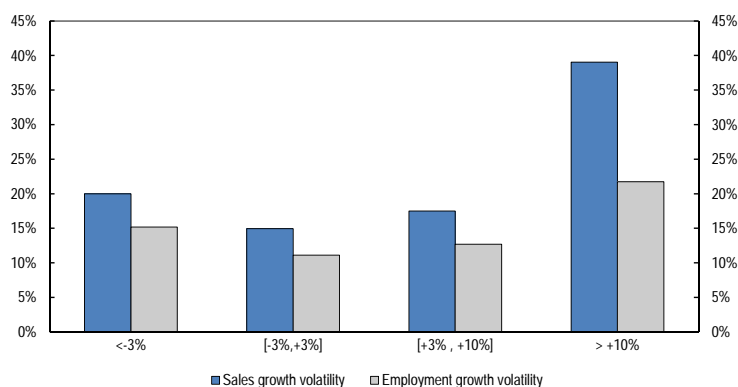


*Note:* Standard deviations of growth rates between 2005 and 2009 by average growth quartile are shown. 20 countries are covered and outliers excluded (see Appendix 2). The results are robust to the exclusion of individual countries.

*Source:* ORBIS firm-level database.

44.  Finally, related to both age and growth, volatilities are likely to depend on firm size. Indeed, Haltiwanger et al. (2008), using a firm-level database covering 16 developed and emerging countries, find strong evidence of a negative link between the number of employees in a firm and the rate of job flows. Using the ORBIS database confirms these results (Figure 10). Bigger firms show less volatile employment growth than smaller firms. The relationship is less evident for sales growth volatility although very small firms seem to exhibit more volatile sales growth rates than big firms.[12] Fort et al. (2013) show that it is the interaction of age and size that determines the dynamics of firms. Young and small businesses are more sensitive to the cycle than older and larger businesses. Since young firms disproportionally contribute to job creation the large decline in the number of of young and small businesses during the Great Recession is important for understanding not only the depth of the recession, but also the slow recovery.

**Figure 10.    Sales and employment volatility by firm size**



*Note:* Standard deviations of growth rates between 2005 and 2009 by firm size quartile are shown. Firm size refers to the number of employees. 20 countries are covered and outliers excluded (see Appendix 2). The results are robust to the exclusion of individual countries.
*Source:* ORBIS firm-level database.

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12.    Measuring firm size by the level of sales gives very similar results.

*3.1.2. Households*

45.      Gorbachev (2011) shows that the trend increase in US consumption volatility over the period 1970-2004 is heterogeneous across households depending on their characteristics. For househo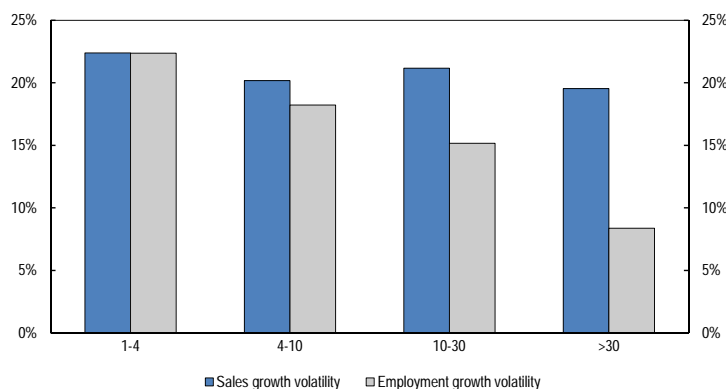lds headed by non-white and poorly educated individuals, the rise in the volatility of consumption was significantly larger than for the average household. Hence, race and education were important in explaining the increase in the volatility of household consumption.

46.      The level of education has also been shown to be an important determinant of earnings volatility. Low-wage and less-educated US workers exhibit greater instability, raising concerns about whether consumption and welfare in that portion of the population has been adversely affected, particularly given the high likelihood of liquidity constraints for this income group and the imperfect public social insurance available to them (Gottschalk and Moffitt, 1994). Similarly, Gottschalk and Moffitt (2009) show that the bottom-25th percentile of permanent earnings experienced the least stable earnings among US workers. In addition, the increase in income volatility can be seen in each major education group, but it was more pronounced for less-educated households (e.g. Dynan et al., 2012b; Dahl et al., 2011, both studies are for the United States).

47.      Similarly, in 22 OECD countries, earnings volatility is larger for less educated and young workers, employees with health problems, and workers with fixed-term contracts and the self-employed (Venn, 2011). While men have a higher probability of experiencing large year-to-year increases in earnings than women, the opposite is true for decreases in labour earnings.

48.      Finally, as for firm sales and employment growth volatilities, labour earnings growth volatility seems to be related to age. Sabelhaus and Song (2010) show that the volatility of earnings growth is negatively correlated with age and that there has been a downward trend in earnings instability that has been common across all age groups during the Great Moderation. This suggests that population ageing in the United States cannot be a source for the Great Moderation in aggregate economic activity.

49.      Using the EU-SILC database, Table 1 shows the proportion of workers with at least a 20% increase or decrease in gross earnings by personal and job characteristics. Contrary to the findings by Venn (2011), male workers tend to experience somewhat smaller earnings increases than women, while there is no effect by gender for large decreases. Less educated workers tend to experience larger earnings increases and decreases than more educated ones. Younger workers suffer more often from volatile labour earnings (both large increases and decreases). Very high and very low income workers exhibit smaller increases than middle income workers, while large decreases tend to be concentrated on low income workers. Finally, temporary and self-employed workers tend to experience more volatile labour earnings (both large increases and decreases).

ECO/WKP(2014)11

Table 1.   Proportion of workers with at least a 20% increase or decrease in real labour earnings

|  | At least 20% increase | At least 20% decrease |
|---|---|---|
| Gender: Female | 0.23 | 0.19 |
| Male | 0.21 | 0.19 |
| Age: 25-35 | 0.27 | 0.20 |
| 26-49 | 0.21 | 0.18 |
| 50+ | 0.19 | 0.19 |
| Education:  Less than upper | 0.23 | 0.22 |
| Secondary education | 0.22 | 0.19 |
| Tertiary education | 0.20 | 0.16 |
| Income quartile:  Lowest quartile | 0.24 | 0.43 |
| Second quartile | 0.20 | 0.14 |
| Third quartile | 0.19 | 0.10 |
| Highest quartile | 0.24 | 0.07 |
| Type of contract:  Temporary | 0.36 | 0.21 |
| Permanent | 0.19 | 0.12 |
| Self-employment | 0.30 | 0.36 |

*Note:* The numbers show the average incidence of large increases or decreases for the years 2007 to 2010.

*Source:* Calculations based on data from EU-SILC.

### 3.2. Smoothing mechanisms

#### 3.2.1. Firms

50.     A firm's ability to smooth output and employment when facing adverse shocks depends on the country's financial development and financial sector regulation. Better access to bank credit has been found to be associated with lower firm-level volatility. For example, Larrain (2006) argues that growth in industries that depend on external finance is less volatile in countries with more bank credit relative to GDP. Similarly, Correa and Suarez (2009), exploiting the staggered timing of state-level banking deregulation in the United States during the 1980s, find that firm-level employment, production and sales have become less volatile after interstate banking deregulation, particularly for firms that have limited access to external finance. Their finding suggests that bank-dependent firms exploit wider access to finance after deregulation to smooth out idiosyncratic shocks.

51.     At the same time, a series of empirical studies have analysed the accelerator role of financial frictions in credit supply, providing evidence that borrowing firms become more fragile as the financial situation of their lenders deteriorates. For instance, Gan (2007) shows that, following the collapse in land prices in Japan in the early 1990s, the investment and market valuation of non-financial corporations were negatively associated with the real estate exposure of their primary lending banks.

52.     The importance of the role of the financial sector as credit provider for fluctuations in firm sales has been particularly pronounced during the recent economic crisis, as documented by several studies. Chodorow-Reich (2013) shows that, in the United States, small and medium-sized firms which had pre-crisis relationships with less healthy lenders were less likely to obtain a loan after the Lehman bankruptcy and reduced employment by more compared to pre-crisis clients of healthier lenders. In a related study on the United States, Greenstone and Mas (2012) demonstrate that state counties with less healthy banks experienced larger reductions in small business lending and deeper declines in output than counties with healthier banks.

53.     For the pre-crisis period, Davis and Kahn (2008) find that the volatility of aggregate output growth declined significantly more than the volatility of sales hinting at a more efficient inventory

management. Indeed, the decline of the inventory-sales ratio in the durable goods sector broadly coincides with the decline of output growth volatility. McCarthy and Zakrajsek (2007) find that the interaction between inventory management and the macroeconomic environment rather than inventory management alone determined the reduction of aggregate output volatility. They conclude that the quicker correction of inventory imbalances was a consequence of a better macroeconomic environment, likely better anchored monetary policy, resulting in less persistent demand shocks.

54.     Finally, firms also provide employees with implicit insurance through a flat wage profile (for evidence on Italy, see Guiso et al., 2013) as firms have better access to the capital market which allows them to smooth wages when facing temporary output shocks.

### 3.2.2. Households

55.     With complete financial markets, income variations could be smoothed by changes in the financial assets and liabilities of households. Moreover, pension funds allow households to transfer consumption from their working years to the retirement period. However, the enhanced ability to smooth consumption over the life cycle comes at the cost of reducing the scope for short-term smoothing due to the limited liquidity of pension assets. This is particularly relevant in countries with low saving rates and hence limited room to cushion adverse income shocks.

56.     Financial markets are, however, not complete. Blundell et al. (2008) show that there is little insurance of permanent income shocks among households in general and of transitory shocks among poor households. Cochrane (1991) rejects full insurance of consumption growth for long illness and involuntary job loss. Attanasio and Davis (1996) argue that the dispersion of consumption and education increased across cohorts during the 1980s in the United States, which is inconsistent with between-group consumption insurance. Gorbachev (2009) finds that income volatility is associated with volatile household consumption in the United States, particularly for vulnerable households.

57.     The ability to offset unexpected and transitory changes in income through borrowing declines in the presence of liquidity constraints. Guiso et al. (1996) find some evidence that borrowing constraints induce Italians to keep their wealth in a safer and more liquid form. Dynan et al. (2006) point out that financial innovation should have enhanced households' access to credit over time and thus strengthened their ability to smooth consumption in the face of income shocks. However, Jappelli and Pistaferri (2011) find that the process of financial market integration and liberalisation has not affected the sensitivity of household consumption with respect to income shocks in Italy between 1987 and 2006.

58.     Borrowing constraints have become particularly relevant during the recent financial crisis, as shown by a number of studies. For the United States, Mian et al. (2013) find that the marginal propensity to consume was sharply higher for poorer and more leveraged households, and Dynan (2012a) argues that highly leveraged home owners cut their spending more than other home owners. These results are partially explained by banks' tightening of credit conditions.

59.     Higher stock market participation of households over time in OECD countries may also have enabled them to better smooth consumption. However, Guiso et al. (2003) show that lower participation and transaction costs have lured less sophisticated and poorer households to invest in the stock market. They conjecture that this may have induced greater volatility in share prices, since such households may react excessively to market signals because of poor judgement or limited ability to withstand financial pressure. Kuebler and Schmedders (2012) develop and estimate a model that conforms with the popular notion that financial innovation leads to increased asset price volatility. The intuition is that financial innovation makes markets more complete and hence allows agents with heterogeneous beliefs about future states of the economy to make trades that were previously not feasible. Similarly, Davis and Willen (2000)

show that households do not seem to use asset portfolio allocations in an optimal way to hedge against labour market uncertainties, since innovations to labour income are not significantly correlated with contemporaneous aggregate stock market returns.

60.     Alternatively, real estate wealth can be used to smooth consumption, especially if households are liquidity-constrained. Carroll et al. (2003) find that many households engage in precautionary saving and that this primarily occurs through home equity. Hurst and Stafford (2004) argue that in the United States liquidity-constrained households, when facing unemployment shocks, have been more likely to make use of refinancing schemes for their mortgages than non-liquidity-constrained households. In the presence of declining interest rates, this lowers mortgage payments and offers an additional source of income that can be consumed. Moreover, mortgage equity withdrawal offers a temporary cash flow that can be used to smooth consumption in bad times. In addition, debt reliefs can serve as an insurance against falling home prices. During the recent financial crisis, the US government further relieved struggling homeowners by exempting forgiven debt from taxable income.[13]

61.     Besides financial markets, extended family networks, progressive income taxation and government transfers (see Section 4) may enable households to offset earnings shocks. Dynarsky and Gruber (1997) find that American families have benefited from both self-insurance through savings and the tax and transfer system, with the latter dominating in the face of unemployment shocks. Unemployment insurance schemes, tax credits, food stamps or housing assistance have been shown to reduce the impact of income shocks on consumption in the United States (Hardy, 2012; Blundell and Pistaferri, 2003; Gruber, 1997; Browning and Crossley, 2001 or Kniesner and Ziliak, 2002).

62.     Extended family networks can be important to smooth consumption in the face of income shocks. Dahl et al. (2011), for instance, show that household income for US households tends to vary less than individual workers' earnings, in part because many households have more than one source of income and additional non-labour income. For Korea, Park and Shin (2010) find that income pooling within families is the most important instrument to offset adverse shocks to a family member's income and to smooth household consumption.

63.     Also household formation influences household income and its volatility. For example, during good times individuals choose to form households, leave the parents' house, marry, etc., while in bad economic conditions these decisions are delayed. Kaplan (2012) shows that the option to move in with the parents serves as an insurance against labour market and hence income risk. Paciorek (2013) shows that, in the United States, the short-run dynamics of household formation reflects the effects of the business cycle. In particular, poor labour market outcomes have played an important role in depressing the household formation rate during the Great Recession.

### 3.3. Trade openness and risk sharing

64.     It is widely agreed that trade and financial market integration yield important benefits by promoting economic growth. The empirical literature that studies the links between trade and financial liberalisation and economic stability is also substantial but far less conclusive. On the one hand, openness to trade and foreign financial markets generates a higher potential for diversification and risk sharing. On the other hand, it exposes a firm to additional sources of risk and shocks to foreign markets.

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13.     The Mortgage Forgiveness Debt Relief Act of 2007 and its extending amendment allowed exclusion of income realised as a result of debt reduction on the taxpayer's principal residence. Indeed, normally, debt that is forgiven or cancelled must be included as income and is taxable.

*3.3.1. Trade openness*

65.     Buch et al. (2009) find that exporting firms exhibit lower sales growth volatility than non-exporters, which they explain by diversification effects across foreign markets. On the other hand, Vannoorenberghe (2012) shows that domestic sales growth volatility of exporters rises with the share of exports in total sales since shocks on export markets lead to adjustments in domestic markets due to substitution effects.

66.     In terms of individual income risk, the theoretical literature has discussed several channels through which trade openness and globalisation can affect income volatility. Increased international exposure is likely to induce a reallocation of capital and labour across firms and sectors, by increasing foreign competition in the import competing sectors. In the short run, the resulting turbulence may raise individual labour income risk. Going beyond the reallocation effect, Rodrik (1997) indicates that increased foreign competition increases the price elasticity for the demand of goods, which raises the wage elasticity of domestic labour demand. On the other hand, Bhagwati (1995) highlights the role of trade in the transmission of foreign shocks, calling it "kaleidoscopic" comparative advantage. The internationalisation of markets narrows the margin of comparative advantage enjoyed by countries, making industries footloose and leading to volatility in comparative advantage, i.e. to kaleidoscopic comparative advantage between countries. This has led to increased labour turnover, which in turn increases earnings variability.

67.     Micro-evidence linking trade openness to income volatility shows mixed results. Traca (2005) finds that wage volatility is greater in tradable than in non-tradable US sectors, and increases with the industry's degree of openness. However, among tradable sectors, wage volatility declines as the industry's global market share rises. Buch (2008) indicates that the degree of international openness of a sector could affect the bargaining power between workers and employers through a "threat of offshoring". The result could be an increase in the income volatility of workers. However, her empirical analysis shows that trade openness has no significant impact on labour income volatility. Hällsten et al. (2010) analyse the impact of trade on earnings volatility in Sweden by examining volatility trends in the manufacturing and the service sector. They argue that if trade increases uncertainty, volatility trends should differ markedly across industries since manufacturing, in contrast to services, is exposed to international competition, but they find that volatility trends do not differ greatly.

*3.3.2. Financial market integration*

68.     The Great Recession made evident that highly integrated financial markets can be a driving force of macroeconomic crises and increase the amplitude of downturns (Reinhart and Rogoff, 2008 or Schularik and Taylor, 2012). Several papers have addressed the role of global financial market integration and the extent to which it contributes to the propagation of financial shocks from one economy to another through the bank lending channel. Chava and Purnanandam (2011), for instance, investigate the effects of the 1998 Russian crisis and ensuing capital flight from Brazil to the US economy. They find that domestic banks exposed to the exogenous foreign shock cut lending significantly more than unaffected banks, and that firms primarily relying on bank finance incurred larger declines in their market valuation and profitability than firms with access to the securitised debt market.

69.     At the macro level, other papers have addressed the role of financial openness and financial development empirically and found a non-linear relationship between the volatility of aggregate consumption or output and financial integration. Kose et al. (2003) find that, up to a certain threshold, financial development is associated with increasing consumption growth volatility. Beyond that threshold, the benefits of improved risk sharing due to international integration kick in and reduce consumption volatility. Similarly, Calderon et al. (2004) show that emerging countries, after experiencing financial instability due to increasing openness, start to benefit from international financial markets once they reach

a certain level of maturity. Easterly et al. (2001) argue that financial depth, as measured by the credit to GDP ratio, reduces aggregate output volatility due to enhanced smoothing but that too much credit can also increase volatility and exacerbate downturns. Mendoza and Terrones (2008) find that credit booms have different origins in emerging (capital inflows) and industrialised countries (deregulation and TFP gains). Fluctuations are more substantial in emerging countries and credit booms lead more often to financial crises than in industrialised countries.

70.      Empirical studies addressing the implications of financial openness on consumption, earnings and employment at the micro level are scarce. A recent cross-country investigation, involving European countries as well as Japan and the United States, finds that a higher degree of financial globalisation increases the volatility of hours worked with the effect being particularly pronounced for low-skilled workers (Buch and Pierdzioch, 2013). Buch and Yener (2010) find that capital account liberalisation has lowered consumption volatility in Canada, Italy, Japan, and the United Kingdom. However, the volatility of consumption relative to output has not declined.

### *3.4. Defining excess volatilities of sales and earnings growth rates*

71.      As illustrated above, various firm and household characteristics affect microeconomic volatility. Not controlling for these characteristics when investigating the link between policies and firm- and household-level volatility poses various econometric problems. First, different characteristics across countries create a selection bias. Second, the econometrician is facing an endogeneity problem due to the omitted variable bias as some policies may affect size and growth of the firms. Since size and growth are also correlated with volatility, omitting them would over- or understate the policy's impact on volatility. Third, it reduces the bias induced by a potential lack of representativeness of the firms and households used in the dataset.

### *3.4.1. Firms*

72.      In order to correct for the selection and the omitted variable bias, *excess* firm-level volatility is defined as the residual of the following pooled regression:

$$\sigma_i \ = c + \beta_1 * \log(EMP_i) + \beta_2 * \mathrm{g}_i^2 + \beta_3 * \mathrm{age}_i + \varepsilon_i \qquad (1)$$

where $\sigma_i$ denotes the standard deviation of individual firm sales or employment growth rates over the 2005-09 5-year window. $EMP_i$ is the average number of employees of firm $i$ between 2005 and 2009, $\mathrm{g}_i^2$ the squared average sales or employment growth rates, capturing a potentially u-shaped link between growth and volatility, and $\mathrm{age}_i$ the firm's age in 2005. Table 2 displays the estimated coefficients and confirms the high degree of significance of each of the control variables (size, growth and age).

Table 2.   **Impact of firm characteristics on sales and employment volatility**

|  | (1) Std. dev. of sales growth | (2) Std. dev. of employment growth |
|---|---|---|
| Size | -0.0075*** (0.00021) | -0.014*** (0.00024) |
| Growth (squared) | 0.97*** (0.014) | 0.19*** (0.0044) |
| Age | -0.0017*** (0.000025) | -0.0029*** (0.000030) |
| Observations | 680380 | 680380 |

Note: Standard deviations are calculated over the period of 2005-09 for firms with non-erratic movement in sales and employment (see Appendix 2). Size is the log of the average number of employees, growth is the squared average sales growth rate over 2005-09 and age denotes the firm's age in 2005. Regressions include sector-dummies (coefficients not reported) in order to account for industry-fixed effects. Standard errors are reported in parentheses and * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
*Source:* ORBIS firm-level database.

73.　　　Figure 11 displays the average and median excess volatility of sales growth by country ($\varepsilon_i$ in equation (1)). Compared with the non-filtered volatilities (Figure 2), only the US has changed rank considerably with respect to the other countries. Indeed, while seemingly hosting firms which show little volatility, most of the lower degree of volatility is related to the size and age of American firms in the sample. Besides the US, the country ranking has not significantly changed and, even after controlling for size, growth and age, several European countries host the least volatile firms.

**Figure 11.　　Excess volatility of sales growth by country**
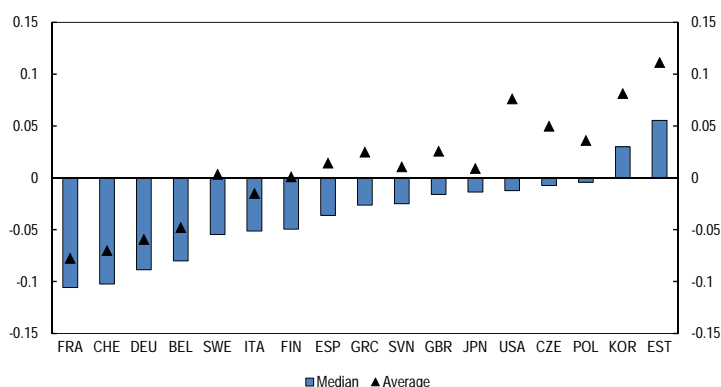
*Note:* Based on residuals obtained from regressing sales growth volatility on age, size and squared growth (see Table 2).
*Source:* ORBIS firm-level database.

74.　　　Figure 12 shows the same results for excess average and median volatility of employment growth rates between 2005 and 2009. As for volatility of sales growth, US companies rank among the most volatile firms when controlling for age and size. In some countries, notably in Southern Europe, the difference between average and median volatility is particularly important reflecting the volatility of some companies compared with the median firm in these countries.

**Figure 12.　　Excess volatility of employment growth by country**
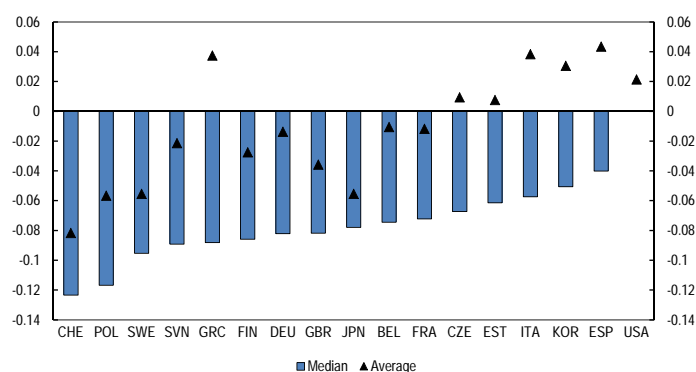
*Note:* Based on residuals obtained from regressing sales growth volatility on age, size and squared growth (see Table 2).
*Source:* ORBIS firm-level database.

75.　　　As Figure 11 and 12 illustrate, after controlling for size, growth and age, there are considerable differences in median and average excess volatilities across countries. The next section will investigate whether these differences can be related to different policies. As an example, Figure 13 compares excess sales growth volatilities with the Voice and Accountability measure from the World Bank's World

Governance Indicators.[14] The results suggest a negative association between the quality of governance and the volatility of firms' sales.

**Figure 13.    Governance and the volatility of sales growth by country**
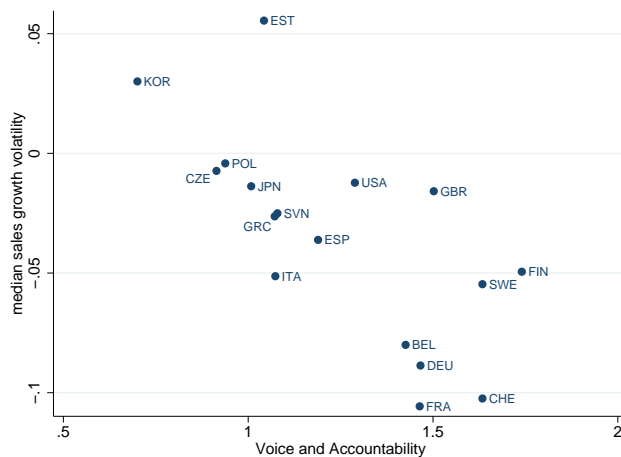


*Source:* Excess median sales growth volatilities as in Figure 11. Voice and accountability is taken from the World Bank's World Governance Indicators.

### 3.4.2. Households

76.      The incidence of earnings volatility is affected by worker and job characteristics (Section 3). Following a similar strategy as for firms *excess* volatility is estimated after controlling for worker and job characteristics. Using the EU-SILC database, pooled (across countries) multinomial-logit are estimated to examine the impact of personal and job characteristics on the probability of large earnings increases and decreases. The regression includes controls for age, sex, education, and income quartile.

77.      Based on univariate statistics, Table 1 showed that personal and job characteristics can be important. Using multi-nominal logit regressions, Table 3 shows marginal effects of these characteristics. It suggests that male workers have a lower (higher) probability of experiencing large earnings increases (decreases) than women. Less educated workers have a higher (lower) probability of experiencing large increases (decreases) than more educated workers. Younger workers tend to receive more often large increases in labour earnings, while the age is not important to explain decreases. High income workers exhibit a lower probability than middle income workers (the omitted category, the second quartile) of experiencing large decreases. However, low and high income workers exhibit a higher probability of large increases, while large decreases are more probable at the low end of earnings distribution.

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14.      The measure captures "perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media."

**Table 3.   Impact of personal and job characteristics on earnings volatility**

|  | (1)<br>At least 20%<br>increase | (2)<br>At least 20%<br>decrease |
|---|---|---|
| Male | -0.0362***<br>(0.00157) | 0.0713***<br>(0.00137) |
| Age: 25-35 | 0.0616***<br>(0.00176) | -0.000334<br>(0.00158) |
| 50+ | -0.0286***<br>(0.00187) | 0.00522**<br>(0.00159) |
| Education:   Less than upper secondary | 0.0144***<br>(0.00191) | -0.0152***<br>(0.00161) |
| Tertiary education | -0.0406***<br>(0.00189) | 0.0412***<br>(0.00169) |
| Income quartile:   Lowest | 0.0632***<br>(0.00203) | 0.208***<br>(0.00152) |
| Third quartile | 0.0116***<br>(0.00223) | -0.0700***<br>(0.00211) |
| Highest quartile | 0.0876***<br>(0.00227) | -0.139***<br>(0.00239) |
| Observations | 356866 | 356866 |

*Note:* Estimated marginal effects (in percentage points) from multinomial logit-regressions. Dependent variable is an indicator variable with: -1: at least 20% real decrease; 0: changes in earnings between −20% and +20%; 1: at least 20% real increase. All regressions include time-fixed effects. Robust standard errors are adjusted by clustering at the country level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The data span from 2007 to 2010.
*Source:* Calculations based on EU-SILC.

78.      Following a similar strategy as with firms, excess volatility is defined as the difference between the observed incidence of volatile gross earnings and the estimated probabilities from the multinomial-logit regression. Figure 14 shows that the incidence of earnings volatility (large decreases and increases) varies considerably across countries, even after controlling for cross-country differences in worker and job characteristics. This suggests that institutions and policies may play an important role, which will be explored next.

**Figure 14.      Excess volatility of labour earnings**
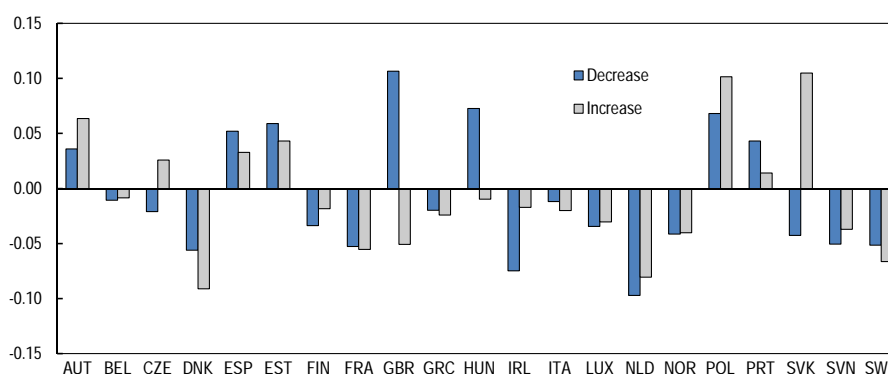


*Note:* Excess volatility of large increase or decreases is estimated with the residuals of the multinomial logit regression controlling for gender, age, education, income quartile, type of contract and self-employment. See note below Table 3. The data span from 2007 to 2010.
*Source:* Calculations based on EU-SILC.

**4. Growth-promoting policies and microeconomic stability**

79.     This section reviews the existing literature on the theoretical and empirical foundations on how economic policies and institutions affect microeconomic volatility, notably firm sales and household earnings. In addition, based on the excess volatility measures presented in Section 3.4., simple bivariate correlations are produced so as to provide the reader with a first graphical view of the relationships.[15] This prepares the ground for a more thorough econometric analysis to follow which will draw on causalities between policies and microeconomic stability by controlling for policy interactions and other macroeconomic settings.

*4.1. Labour market institutions*

80.     Labour market institutions affect earnings and disposable income of households through their impact on wage rates, employment dynamics and out-of-work income maintenance schemes. Some policies target one particular area, but exert spill-overs on the others. In doing so, the impacts may be either offsetting or reinforcing each other with very different implications for fluctuations of earnings and employment.

81.     The literature and previous Working Party 1 work have extensively studied the impact of labour market institutions on the level of employment, the accumulation of human capital and wage dynamics at the macroeconomic level. Less is known about how they affect other determinants of welfare at the individual level. Recently, Koske et al. (2012) investigated the impact of labour market policies on the income distribution and found that some policies can achieve both higher growth and greater equality. In addition and highly relevant for the present study, labour market institutions also determine the way labour markets react to demand and supply shocks. Speed, size and persistence of the adjustment process greatly influence labour-market volatility.

*4.1.1. Employment protection legislation*

82.     At the macro level, earlier OECD work (Duval et al., 2007) suggested that tight job protection cushions the impact of a shock, but gives rise to greater persistence of the output gap. Updated evidence suggests that while the cushioning effect has weakened somewhat during the recent crisis the adverse persistence effect is still there (Ziemann, 2013). Similarly, de Serres and Murtin (2013) find that employment protection legislation (EPL) for regular workers is associated with lower cyclical volatility, but higher persistence of unemployment over time. Bassanini (2011) finds that stringent dismissal regulations mitigate the effect of adverse shocks on both, earnings and employment.

83.     These findings are consistent with the arguments put forward by Caballero et al. (2004) who, using a panel of 60 countries, show that stringent job security regulation hampers the adjustment process in labour markets. Importantly, the authors find that the size of the impact significantly depends on the strength of law enforcement. Haltiwanger et al. (2008) confirm these results and find that most of the smoothing effect of more stringent EPL is due to lower firm turnover (entry and exit) while the effect on continuing firms is insignificant. As a result, less stringent EPL should stimulate entry during and after downturns and improve the reallocation process.

84.     Using firm level data, Gal et al. (2012) find that employment protection of regular workers cushions the propagation of output shocks towards employment but amplifies the shock on earnings per employee because it can lead to an excessive use of temporary contracts (Boeri, 2001 or Cahuc et al.,

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15.     One caveat of using excess volatility is that it creates a potential endogeneity problem as some policies may drive household and firm characteristics.

2012). Labour market dualism is not only detrimental to the development of human capital (Koske et al. 2012), but also leads to greater unemployment fluctuations (Sala et al., 2012) in particular in response to adverse shocks (Costain et al., 2010). Costain et al. (2010) also underline the strong interaction of employment protection legislation and law enforcement. Indeed, while EPL for temporary contracts in Spain is among the most stringent in the OECD, the incidence of temporary work is actually high leading to rather strong employment fluctuations (Bentolila et al., 2012).

85.     Stringent EPL affects productivity negatively by constraining labour reallocation. As shown in Bartelsmann et al. (2013), stringent employment protection is negatively associated with the size of high-risk innovative sectors as high firing costs reduce the expected value of risky innovations and induce firms to stick with the certain but less productive technology. In addition, the related high exit costs lower the exit threshold which not only increases the dispersion of productivity across firms but also lowers average productivity. Similarly, Poschke (2009) shows that too stringent employment protection impedes labour reallocation, discourages entry of firms but also discourages the exit of unproductive firms and thereby lowers growth.

86.     OECD research (Employment Outlook, 2009) finds that stricter EPL for regular and temporary workers tends to reduce worker flows in and out of unemployment. While for permanent workers the negative impact of employment protection on unemployment outflows (i.e. hires) dominates the negative impact on inflows (i.e. separations), EPL for temporary workers has a stronger negative impact on unemployment inflows than on outflows.

87.     In a recent study, Bassanini and Garnero (2013), using industry level data, suggest that more restrictive dismissal regulations reduce the rate of job-to-job transitions within industries, while they have no effect on transitions towards unemployment or transitions across industries. The authors argue that while a liberalisation of dismissal regulations increases dismissals, it simultaneously increases the job finding rate. This is consistent with previous findings suggesting that EPL mitigates the transmission of adverse output shocks to employment while increasing its persistence.88.Sologon and O'Donoghue (2011) show that European countries exhibit a non-linear relationship between EPL and earnings volatility. At low protection levels, an increase in EPL leads to reduced earnings volatility, while increasing EPL from an already high level, increases earnings volatility. The magnitude of the effect depends on the policy mix, with a stronger reduction in earnings volatility at low levels of EPL, when ALMP spending is high.

89.     Figure 15 shows the association between excess volatility of labour earnings and labour market duality using the EU-SILC database. Even if there is no clear relationship, there are clusters of countries. Three Nordic countries, as well as Ireland and the Netherlands are in the lower right panel with low excess earnings volatility and a positive gap between regular and temporary EPL. Only Spain is in the higher left panel, with high excess earnings volatility and a negative gap between regular and temporary EPL.[16] All other countries are either in the lower left or in the upper right panel suggesting a positive relationship between excess earnings volatility and the gap between regular and temporary EPL.

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16.     As mentioned above, some authors argue that the interaction of EPL for temporary contracts and law enforcement should be considered. This seems particularly relevant in the case of Spain where temporary contracts are poorly monitored to ensure compliance with regulations which explains the extensive use of temporary contracts despite strict EPL (Bentolila et al., 2012).

**Figure 15.    Excess earnings volatility and labour market duality**
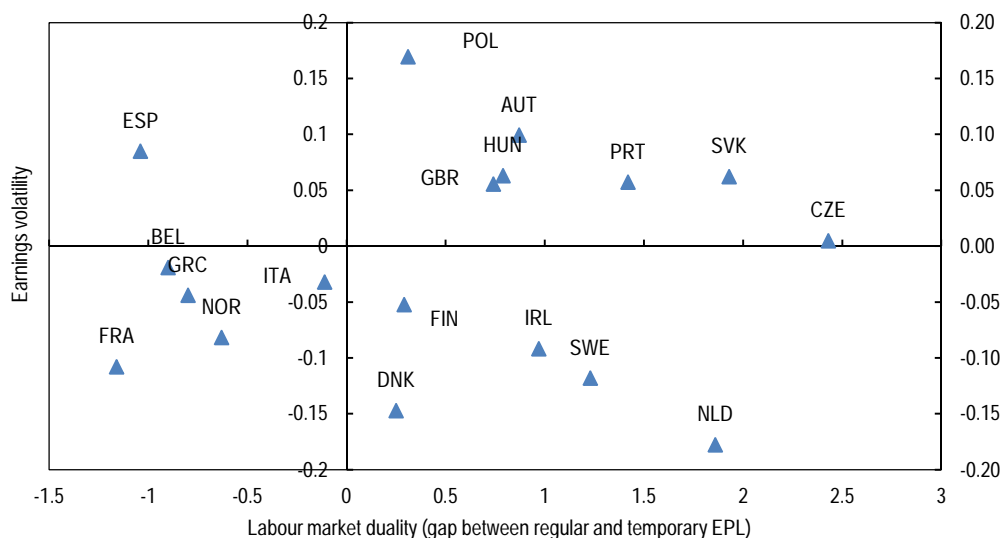


*Note:* Earnings volatility reflects excess volatility of large increase or decreases, estimated with the `residuals' of the multinomial logit regression controlling for gender, age, education, income quartile, type of contract and self-employment. See note of Table 3. The data span from 2007 to 2010.
*Source:* Calculations based on EU-SILC.

90.        Finally, there is a large literature on comparative advantage that arises from more flexible labour markets. Cuñat and Melitz (2012), for instance, show that countries with more flexible labour markets have a higher share of exports in highly-volatile sectors due to their ability to better adjust to shocks. This underpins the outsourcing of highly volatile intermediate goods from restrictive to more flexible countries so as to benefit from the flexibility of the trading partner and enhances the adjustment ability of the global production chain in response to demand shocks.

*4.1.2. Active and passive labour market policies*

91.        Public spending on active and passive labour market policies affects labour market performance as well as resilience and persistence of adverse shocks to employment. Unemployment benefits mitigate the decline in individual income when facing an unemployment shock but they also increase the reservation wage in the short and medium term which weakens job-search intensity and human capital.[17] The disincentive effect of job-search could be partially offset by ALMPs, which are expected to increase the probability of re-employment of workers by training workers during unemployment and improving the matching process. Crépon et al. (2012) suggests that training programmes could extend unemployment duration. The reason is that longer training spells can cause longer unemployment spells, but also longer employment spells, suggesting that training improves the matching process between jobseekers and firms (Lechner et al., 2011). The simple bi-variate relationship depicted in Figure 16 suggests that higher spending on ALMPs could be related to lower employment volatility.[18]

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17.        At the same time, too low unemployment benefits can also hurt human capital by leading to inefficient job matches.

18.        Most European countries spend more on ALMPs (as a per cent of GDP) than the other countries. Taking these regional differences into account, a negative relationship between ALMP spending and employment volatility appears.

**Figure 16.    Active labour market policies and employment volatility**
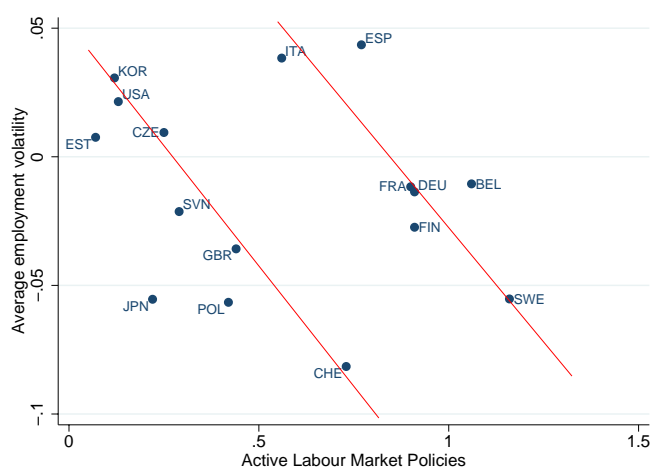


Note: Employment volatility reflects excess firm-level employment volatility (ε in equation (1)). Spending on ALMPs is measured in percentage points of GDP.
*Source:* Calculations based on EU-SILC.

92.        At the macro level, there is evidence that higher levels of unemployment benefits amplify the adverse labour market impacts of economic downturns by increasing the persistence of unemployment (OECD, 2012). This has been broadly confirmed by micro-studies (Tatsiramos, 2009 and Caliendo et al., 2012). On the other hand, generous unemployment benefits may also improve job-match quality by allowing individuals to wait for better job offers (Caliendo et al., 2012). Results from the EU-SILC database (Figure 17) suggest that both ALMPs and unemployment benefits are negatively associated with household earnings volatility.

**Figure 17.    Earnings volatility, ALMP and unemployment benefits**
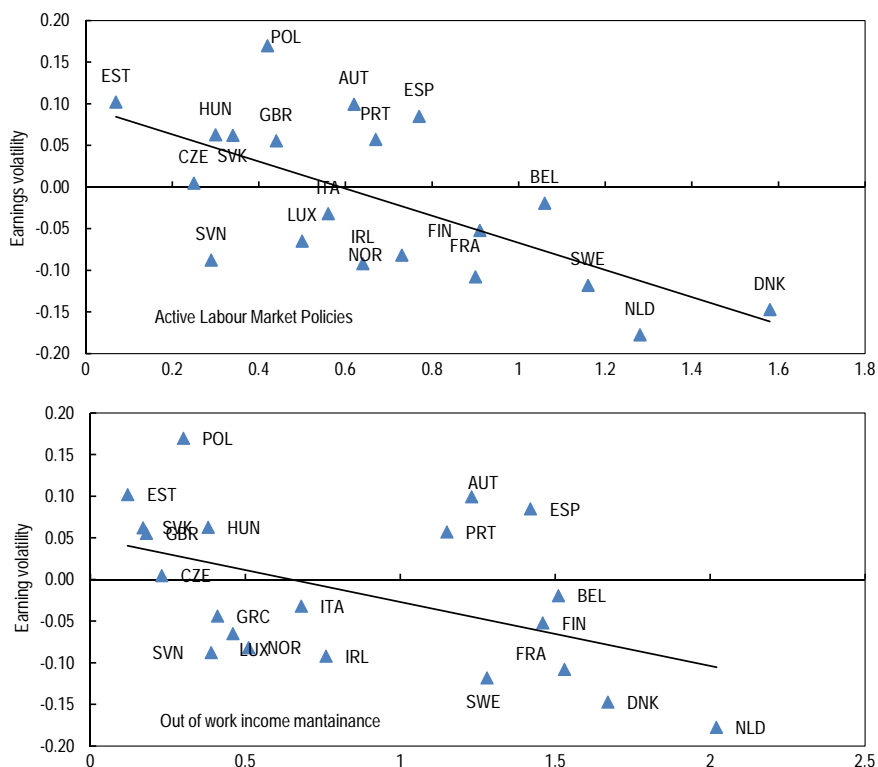


*Note:* Earnings volatility reflects excess volatility of large increases or decreases, estimated with the `residuals' of the multinomial logit regression controlling for gender, age, education, income quartile, type of contract and self-employment. See note to Table 3. Spending on ALMP and work income maintenance and support is measured as per cent of GDP. The data span from 2007 to 2010.

*Source:* Calculations based on EU-SILC.

93.     Other studies using data at the industry-level document an amplification effect of output shocks on labour income when unemployment benefits are more generous, notably due to lower incentives to dispute dismissals and due to reduced job-search efforts which lengthens unemployment spells (Bassanini, 2011 and Buch, 2008). In contrast, using micro-level data, Sologon and O'Donoghue (2011) find a non-linear relationship between unemployment benefits and earnings instability. Lower levels of unemployment benefits are associated with lower earnings instability, while at very high values the effect depends on the institutional mix of the country.

94.     Figure 18 suggests that higher unemployment benefits tend to be accompanied by more stable sales. One explanation may be that unemployment insurance stabilises disposable income in case of temporary unemployment and, by doing so, exerts a stabilising effect on consumption and the demand for products over the business cycle.

**Figure 18.    Unemployment benefits and sales volatility**



*Note:* Sales volatility reflects excess firm-level sales volatility (ε in equation (1)) and spending on out-of-work income maintenance and support is measured as per cent of GDP.

*Source:* Calculations based on ORBIS firm-level database.

*4.1.3. Wage-setting institutions*

95.         The literature typically investigates two dimensions of the wage bargaining process. First, union density and the coverage of collective agreements measure the breadth of the wage bargaining process. Second, the characteristics of the bargaining process are distinguished by the degree of centralisation and the degree of coordination.[19]

96.         There is conflicting evidence on the relationship between wage-setting institutions and income volatility. Buch (2008), using industry data for 11 industrialised countries, finds a negative relationship between union density and labour income volatility especially for highly-skilled labour. Backery et al. (2010) use firm level data for EU countries and conclude that collective bargaining coverage is positively related to downward real wage rigidity. On the other hand, Sologon and O'Donoghue (2011) find that in European countries the degree of unionisation increases earnings instability by introducing a wedge between unionised and non-unionised workers' earnings instability. Unionisation reduces the earnings volatility of members, but increases that of non-union members which results in higher overall earnings volatility.

97.         Previous research suggests that labour market outcomes are superior with either highly coordinated/centralised wage bargaining or uncoordinated/decentralised wage-setting institutions compared to intermediate bargaining arrangements. Generally, in countries with highly centralised or coordinated wage setting, it is possible to internalise the detrimental employment effects of excessive wage pressures which may allow the economy to adjust more quickly to shocks (Bassanini and Duval, 2006).

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19.      All three variables (coverage, centralisation and coordination) are taken from the ICTWSS data base (see Visser, 2011). *Coverage* denotes employees covered by wage bargaining agreements as a proportion of all wage and salary earners in employment with the right to bargaining. *Centralisation* refers to the union authority over branches and representatives and membership concentration at the central, the confederal and the industry level. *Coordination* reflects the scope of agreements, from fragmented, company-level through industry-level to economy-wide bargaining.

However, if shocks are heterogeneous across the economy and persistent, adjustment may become more difficult relative to a more decentralised system.

98.      Sologon and O'Donoghue (2011) also find that a higher degree of centralisation and coordination of the bargaining process is associated with lower earnings volatility. Findings in the OECD Employment Outlook of 2012 suggest that a greater degree of coordination in collective wage bargaining mitigates the direct impact of shocks on employment by facilitating adjustment to wages or working-time, leading to a lower cost of hoarding labour. Figure 19 suggests that indeed, using EU-SILC data to measure the incidence of earnings volatility, excess volatility is negatively associated with the degree of coordination and centralisation as well as the coverage of the wage agreements.[20]

**Figure 19.      Earnings volatility and wage setting institutions**
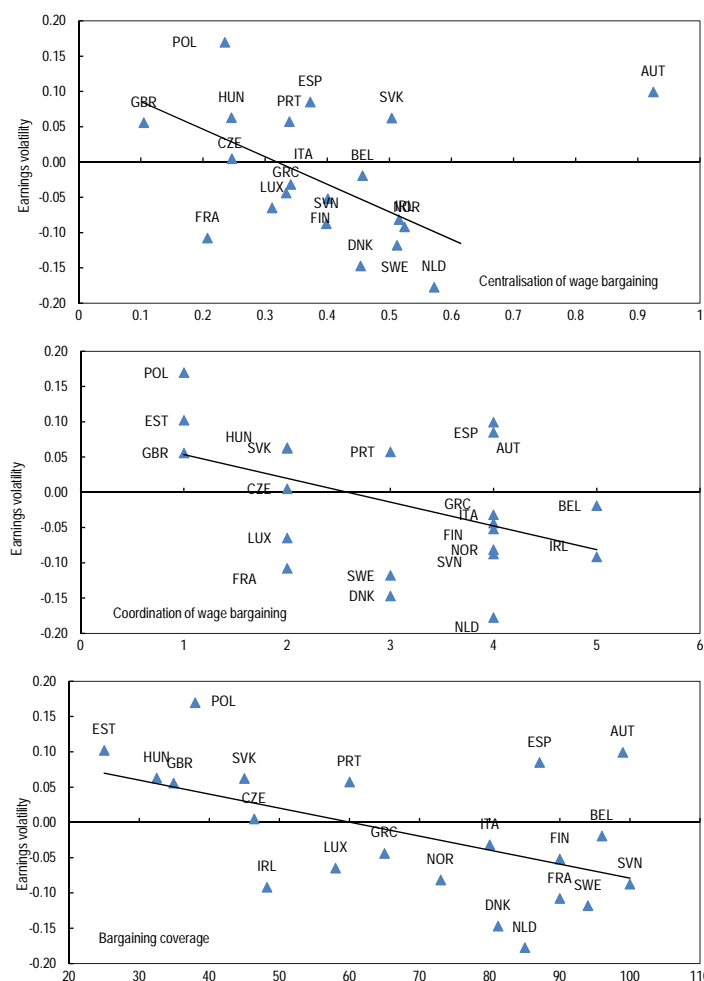


*Note:* Earnings volatility reflects excess volatility of large increase or decreases, estimated with the `residuals' of the multinomial logit regression controlling for gender, age, education, income quartile, type of contract and self-employment. See note of Table 3. Wage bargaining indicators (centralisation, coordination and coverage) are taken from the ICTWSS database (see Visser, 2011 and footnote 19). Data span from 2007 to 2010.

*Source:* Calculations based on EU-SILC.

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20.      The first panel excludes Austria from the regression line. With Austria, the relationship becomes insignificant.

99.      Similar results are obtained for sales volatility (Figure 20). All three measures (centralisation, coordination and coverage) hint towards a negative relationship between the characteristics of collective agreements and the volatility of sales growth.
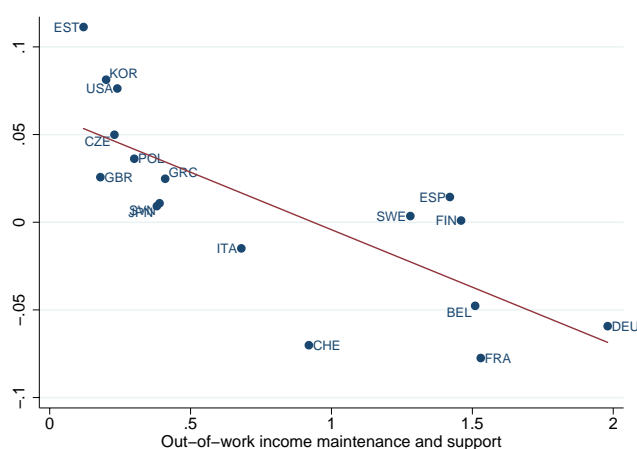
**Figure 20.      Wage bargaining and sales volatility**
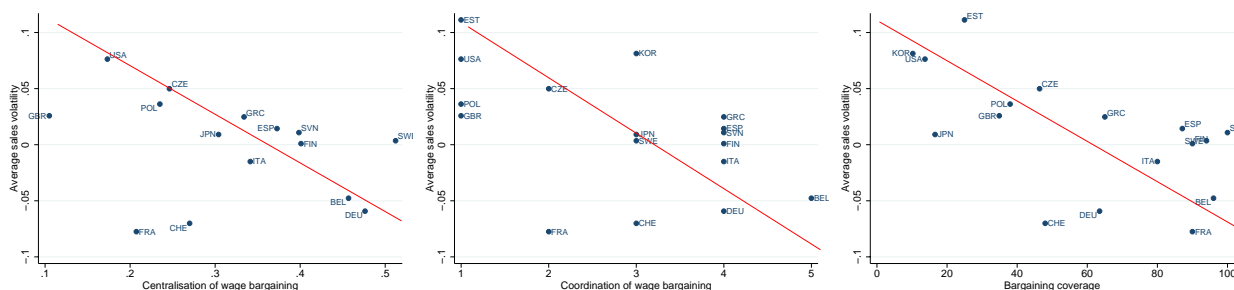


*Note:* Sales volatility reflects excess firm-level sales volatility (ε in equation (1)). Wage bargaining indicators (centralisation, coordination and coverage) are taken from the ICTWSS database (see Visser, 2011 and footnote 19).

Source: Calculations based on ORBIS firm-level database.

*4.1.4. Working-time arrangements*

100.      Part-time jobs and flexible working hour schemes have gained in importance in recent years potentially amplifying the fluctuations of hours worked, while stabilising employment. At the macro level, Ohanian and Raffo (2011) show that volatility in hours per worker contribute considerably to labour input fluctuations in the main euro area countries and Japan, while volatility of labour input is largely determined by employment fluctuations in English-speaking countries. This is consistent with the view that different labour market institutions, notably differences in hiring and firing costs and work-sharing arrangements, may significantly affect how firms adjust labour input along the extensive and intensive margin.

101.      The Great Recession has confirmed these differences. While in Germany employment did not vary and hours worked showed a significant decline, in the United States employment and hours both fell simultaneously. Hijzen and Martin (2013) analyse the impact of short-time work arrangements on employment during the Great Recession and the following recovery in 23 OECD countries. They find that short-time working schemes have helped preserve a significant number of jobs during the crisis, but its continued use during the recovery may have slowed the job-content of the recovery.

102.      Short-time work arrangements may also act as an automatic stabiliser. Using firm level data, Balleer et al. (2013) find that in Germany, short-time work reduces unemployment fluctuations by 21% and output fluctuations by roughly 4%, while the costs of short-time work are only 0.03% of GDP.[21] The labour market institutions prevailing in a country are important in determining the usefulness of short-time work. The authors find that short-time work is more effective in countries where firing costs are higher (see also Cahuc and Carcillo, 2011).

*4.1.5. Performance and overtime payments*

103.      Labour earnings include wages and salaries, and additional components like performance, overtime and bonus payments. These components  make remuneration packages more flexilbe  and help

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21.      To calculate the costs, the authors use the gross transfers to workers due to short-time working arrangements according to the balance sheet of the Federal Employment Agency. At the peak in 2009 the costs were 0.13% of GDP.

firms to adjust gross wages rather than employment in response to changes in demand (Lemieux et al., 2012), Empirical evidence suggests that these components are more pro-cyclical than wage rates. Generally these components are the most volatile source of earnings (e.g. Shin and Solon, 2007 for the United States; Anger, 2010 for Germany and Hart and Roberts, 2013 for the United Kingdom). Accordingly, job contracts that include overtime or performance pay agreements potentially lead to volatile earnings. Most European countries have relatively low performance pay rates of 10–15% rising to around 40% for the Scandinavian countries and the United States for private sector workers (Bryson et al., 2013).

104.     The incidence of performance pay, overtime and bonuses depends on the decisions of firms and workers.[22] Firms' decision to make use of overtime is related to labour legislation or collective bargaining rules that determine penalty rates or restrictions for overtime use. The nature of job tasks also influences the probability of using this type of earnings component. Since the cost of monitoring performance depends on the task, the choice of individual, team or firm-based performance pay becomes important. More complex jobs and those that involve team-work, usually found in larger and more complex firms, are more likely to be partly remunerated by team- or firm-based performance pay (Venn, 2011).

105.     Also worker characteristics influence the probability of participating in overtime and performance pay schemes. Women, for example, are less likely to participate in overtime and performance pay schemes (Venn, 2011), probably due to family responsibilities. Paid overtime is more likely for low-skilled occupations whereas performance pay is more likely to be received by more highly-educated and skilled employees. Workers with longer tenure are more likely to receive performance pay. In contrast, firms that employ temporary workers (and operate at non-standard times) are also more likely to offer paid overtime and performance pay, suggesting that firms use multiple forms of wage flexibility simultaneously.

## 4.2. The tax and benefit system

106.     Bassanini (2011) finds that high and progressive labour taxes amplify gross labour income fluctuations, mainly by amplifying gross wage fluctuations, while employment fluctuations were not affected. Progressive labour taxes make labour supply more inelastic or the wage-setting curve steeper, at least when the latter is defined in terms of gross wages. This facilitates wage adjustments whenever firms need to compress unit labour costs and increases the volatility of the wage rate while restraining the employment adjustment whenever firms need to compress unit labour costs.

107.     Venn (2011) shows that tax and transfer systems play an important role in buffering household disposable income against the impact of market income volatility across 22 OECD countries. There is a significant cross-country variation in OECD countries in the way individual earnings volatility translates into disposable household income volatility. In Portugal, Spain, Italy and Ireland large changes in individual earnings also translate into large changes in household disposable income. Conversely, in the Nordic countries, the tax and transfer system buffers income from the full impact of individual earnings volatility.

108.     Figure 21 presents evidence for the importance of smoothing mechanisms across European countries using the EU-SILC database, showing the impact of a large increase or decrease in individual gross labour earnings of at least 20% on household disposable income. To examine the extent to which other forms of income, taxes and transfers shield individuals against earnings volatility, changes in household disposable income resulting from a large increase or decrease in individual gross labour

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22.     Prendergast (1999) and Hart (2004) provide a comprehensive surveys of the theoretical and empirical literature.

earnings are decomposed into their sub-components: individual labour earnings of the head of household, other household members' labour earnings, household capital income, tax payments, and social transfers.

Figure 21.    Decomposition of the change in household disposable income
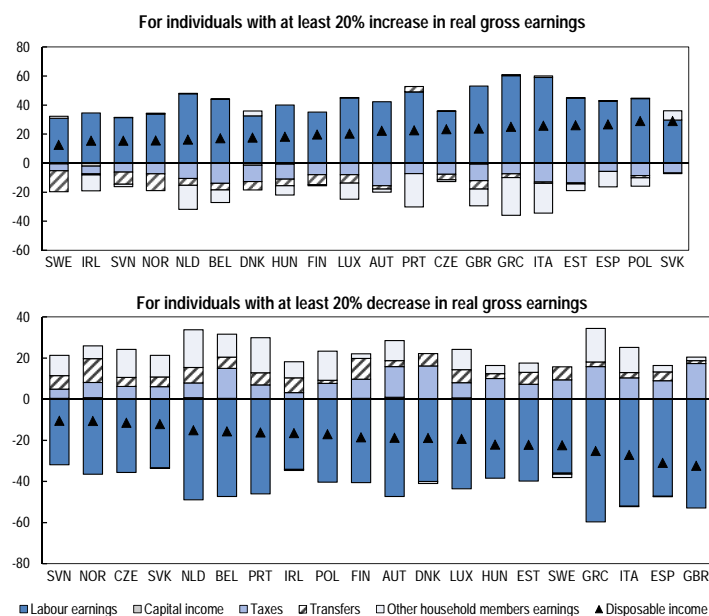


Note: Percentage changes in earnings are calculated as the arc percentage change, i.e. the difference in earnings between two years, divided by the average of the absolute value of the two years. The numbers show the average incidence of large increases or decreases for each country for the years 2007 to 2010. Only workers who worked at least one month over the 2 years are considered. Contributions are calculated based on the following decomposition:

$$\Delta HY_{disp} = \omega_{IY}\Delta IY + \omega_{other\ members}\Delta HY_{other\ members} + \omega_{capital}\Delta HY_{capital} - \omega_{taxes}\Delta taxes + \omega_{transfers}\Delta transfers,$$

with $\omega$ the share of each component, HY household income, IY individual income of the head of the household. The estimates shown are for a head of household aged between 25 and 59 years old, and exclude students, disabled and retired people. Only households with no year-to-year changes in the number of members are taken into account.

Source: Calculations based on EU-SILC.

109.    The results highlight the heterogeneity across European countries in the way shocks to individual earnings are passed through to household income. In all countries disposable income is partially shielded from the full impact of large changes in individual earnings. Social transfers and tax systems are effective instruments to attenuate big changes in earnings. Interestingly, the attenuation effect is largest in countries where individual earnings are less volatile. In the Nordic countries, the change in household disposable income is on average 40% of the size of an increase or decrease in labour earnings while in the United Kingdom, Hungary, Greece, Italy, and Spain it is on average 60% or more.[23]

110.    The income of other members of the family also plays an important role in buffering disposable income, especially in the Netherlands, Italy, Greece and Portugal. On the other hand, capital income plays no role in attenuating or amplifying shocks to labour earnings. This is due to the fact that capital income

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23.    Joumard et al. (2012) find that cash transfers are more effective in reducing inequality in most OECD countries than taxes. Similarly, Darbey and Melitz (2008) find that automatic stabilisation essentially operates through the expenditure side rather than the tax side in 21 OECD countries from 1982 to 2003.

ECO/WKP(2014)11

shows not only small variations, but its weight in disposable income is very small (less than 5% in most cases).[24]

111.     The stabilising role of taxes and transfers for earnings eventually leads to more stable demand. This may explain why the importance of social transfers is negatively related with the volatility of sales (Figure 22).

**Figure 22.     Sales volatility and social transfers**
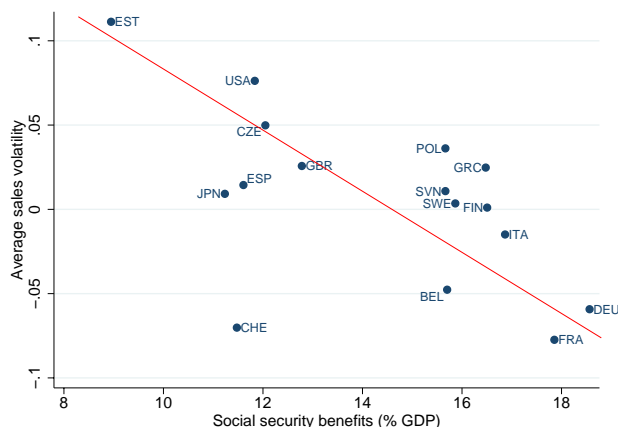


*Note:* Sales volatility reflects excess firm-level sales volatility ($\varepsilon$ in equation (1)).

*Source:* Calculations based on ORBIS firm-level database.

### 4.3. Regulatory framework

112.     Similar to labour market reforms, liberalising product markets is generally seen as growth-enhancing (e.g. OECD, 2013). While there are numerous studies investigating spill-overs on income inequality or domestic and international balances, trade-offs or complementarities with respect to macroeconomic and microeconomic stability are little researched in the economic literature. This section reviews the scarce existing evidence distinguishing product market and financial market regulation.

#### 4.3.1. Financial market regulation

113.     Financial innovation and financial deepening induced by financial market deregulation may affect the volatility of asset prices and the ability of households to smooth consumption. Kuebler and Schmedders (2012) develop and estimate a model that conforms with the popular notion that financial innovation leads to increased asset price volatility. The intuition is that financial innovation makes markets more complete and hence allows agents with heterogeneous beliefs about future states of the economy to make trades that were previously not feasible. On the other hand, Dynan et al. (2006) point out that financial innovation has enhanced households' access to credit over time and thus strengthened their ability to smooth consumption in the face of income shocks.

114.     The higher stock market participation of households over time in OECD countries may have enabled them to better smooth consumption. However, Guiso et al. (2003) show that lowering of participation costs has brought into the stockholder pool less sophisticated and poorer households. They

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24.     Capital income includes income from the rental of a property or land; net interest, dividends, and profits from capital investments in unincorporated business.

conjecture that this may have induced greater volatility in shares, since such households may react excessively to market signals because of poor judgement or limited ability to withstand financial pressure. These concerns lead the authors to discuss types of policies that could mitigate the adverse impact of newcomers on the functioning of financial markets, stressing that government action could aim at ensuring access to accurate financial information and sufficient financial education.

115.     Indeed, at the macro-level greater financial deepening and financial innovation has been found to facilitate consumption and investment smoothing by allowing better risk diversification and inter-temporal smoothing (Dynan et al., 2006; Blanchard and Simon, 2001; Catte et al., 2004). As a result, deeper financial markets are in general associated with lower output volatility and greater resilience in response to exogenous shocks (Cecchetti et al., 2006; Benk et al., 2009; Céspedes and Velasco, 2012), while financial frictions increase labour market volatility at the macro level (Petrosky-Nadeau and Wasmer, 2012; Benmelech et al., 2011). On the other hand, financial market development and financial innovation can favour excessive risk taking which could increase firm-level volatility (Dabla-Norris and Srivisal, 2013).

116.     Correa and Suarez (2009) use US state-level data and find that firm-level volatility has declined after a state allowed out-of-state banks to enter its banking sector through acquisitions. In particular, small firms and firms with restricted access to public corporate debt benefit from the deregulation as evidenced by the greater availability of more counter-cyclical short-term credit. Their finding suggests that bank-dependent firms exploit wider access to finance after deregulation to smooth out idiosyncratic shocks.

117.     Deregulation may have different effects for different kinds of financial fluctuations (e.g. short-term volatility versus protracted misalignments). Acharya et al. (2011) suggest that strong creditor rights reduce financial leverage and risk-taking of firms. They also provide incentives to diversify in terms of acquisitions and business participation. Firms in countries with stronger creditor rights also face lower cash-flow risks. On the other hand, strong creditor protection can impede the adjustment process in times of crises.

118.     Lin et al. (2011) build on the wedge between control rights and cash-flow rights and find that excess control rights, those not explained by the shareholders' stakes, reduce the firm's value and increase its debt financing costs through higher loan spreads.

### 4.3.2. Product market regulation

119.     Comin and Mulani (2006) explain diverging trends between aggregate and firm level volatility by the enhanced ability of firms to appropriate their innovations due to regulatory and technological change and increased competition (see Irvine and Pontiff, 2009). The growing use of such protected innovations has led to more rapid product improvements which in turn have led to an increase in the volatility of firms' sales as patentees experience positive productivity shocks while incumbents incur losses. At the same time, these innovations exert little influence on aggregate volatility of output since gains and losses cancel each other out.

120.     Simultaneously, the incentive to pursue so-called disembodied innovations, the ones that cannot be appropriated by the inventor and affect all firms, has declined which reduced aggregate volatility. Comin and Mulani (2009) illustrate the mechanics by an endogenous growth model with embodied R&D and general innovations. The model further highlights the negative correlation between the intensity of embodied R&D and the output correlation with other sectors which adds another explanation for declining aggregate volatility. Similarly, Comin and Philippon (2006) argue that sales-weighted profit margins have decreased over the past decades compared to average profit margins that remained stable as it has become increasingly difficult to remain the market leader. The increase in competition and R&D investment led to

increases in firm level volatility and, simultaneously, to a decrease of the correlation between firms and thus to a reduction in aggregate volatility.

121.     Similarly, Chun et al. (2011) report rising firm-specific volatility over the final decades of the last century, and they also report that this trend has been reverted with the emergence of new information technologies (IT). Consistent with Comin and Mulani (2009), the authors argue that IT serves as a general purpose technology (GPT), similar to the notion of disembodied innovation that affects the whole economy. In the early stages, GPTs lead to a phase of creative destruction with increasing heterogeneity across firms as the innovation starts to propagate. This is followed by a consolidation phase where heterogeneity recedes as the innovation becomes widespread, which in turn induces a low volatility period.

122.     Philippon (2003) uses a business cycle model with price rigidities and finds that due to increased competition price adjustments have become more frequent. In addition, Jermann and Quadrini (2006) argue that financial innovations reduced financial frictions and allowed for a more flexible use of equity financing and debt management. The increased flexibility of price adjustments and balance sheet items made the economy as a whole more resilient while it increased the idiosyncratic volatility of firm level output and financial flows.

123.     It is widely agreed that policies aimed at increasing product market competition improve labour market functioning, especially in terms of efficiency. In particular, product market competition boosts productivity, employment and real wages (Griffith et al., 2007), raises executive incentives (Cunat and Guadalupe, 2006), induces more on-workplace training (Bassanini and Brunello, 2010). On the other hand, more competition may increase wage inequality (Guadalupe, 2007) and job instability by raising the prevalence of fixed-term contracts (e.g. Aparicio, 2011 for the case of Spain).

124.     Easing product market regulation is likely to play an important role in the shock propagation by facilitating resource reallocation and thereby reducing the persistence of the shock, in particular supply shocks (Sutherland and Hoeller, 2013). Sologon and O'Donoghue (2011) find that deregulated product markets mitigate the adverse effects of macroeconomic shocks on earnings volatility. However, the policy mix is relevant to explain the sign and size of the effect, especially with institutions that affect the bargaining power. Results based on the EU-SILC database (Figure 23) exhibit a positive correlation between the level of product market regulation and earnings volatility.

**Figure 23.     Excess earnings volatility and product market regulation**
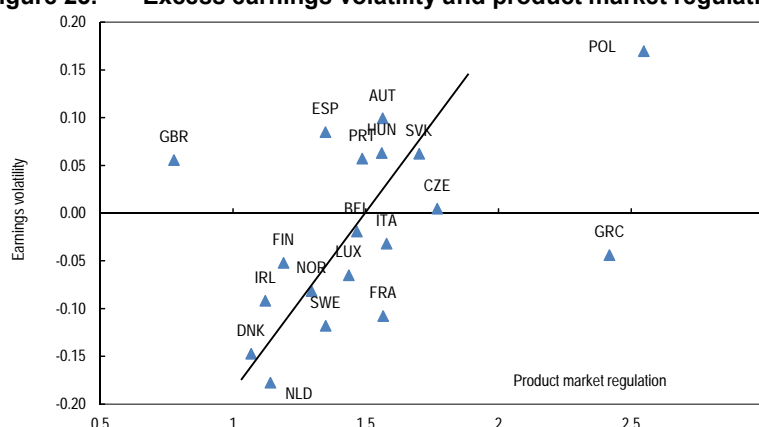


*Note:* Earnings volatility reflects excess volatility of large increases or decreases, estimated with the residuals of the multinomial logit regression controlling for gender, age, education, income quartile, type of contract and self-employment. See note below Table 3. Product market regulation is measured by the OECD's aggregate Product Market Regulation Indicator. The data span from 2007 to 2010.

*Source:* Calculations based on EU-SILC.

125.     One particular aspect of product market regulation concerns the role of the state *via* public ownership and state involvement in private business operations. Figure 24 suggests a stabilising role of state control with respect to the volatility of sales growth. This suggests that state-controlled enterprises are less affected by shocks and grow more smoothly, albeit potentially on less dynamic paths.

**Figure 24.     State control and the volatility of sales**
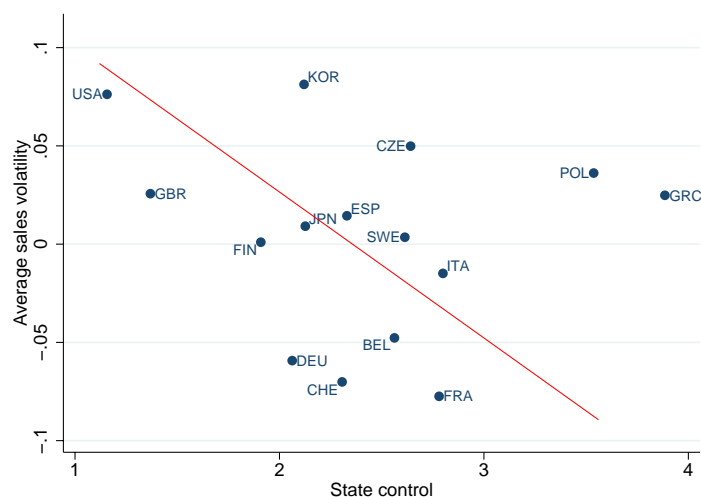


*Note:* Sales volatility reflects excess firm-level sales volatility ($\varepsilon$ in equation (1)). State control is one of the three pillars of the OECD's Product Market Regulation Indicators and reflects the importance of public ownership as well as state involvement in business operations.

*Source*: Calculations based on ORBIS firm-level database.

### 4.3.3. Bankruptcy legislation

126.     The design of personal bankruptcy legislation, notably *via* the definition of the amount and type of assets to exempt in case of default, has important impacts on household consumption behaviour and the supply of consumer credit and mortgages. Lenient exemption levels serve as insurance for households against adverse shocks and help them to smooth consumption in case of default. On the other hand, this mechanism is anticipated by lenders and may induce them to restrict credit and increase borrowing costs. Grant (2010) explores the differences in bankruptcy legislations across US states and shows that, despite a debt-reducing impact, higher levels of exemptions lead to smoother consumption and thus increase welfare.

127.     Oikawa (2013) argues that the bankruptcy cost structure influences the cyclicality of firm-level volatility. While high fixed bankruptcy costs lead to pro-cyclical sales growth volatility (United States), high marginal bankruptcy costs induce counter-cyclical sales growth volatility (Japan). From a welfare perspective the author shows theoretically that, for a given level of total bankruptcy costs, the optimal allocation is achieved where marginal bankruptcy costs equal fixed bankruptcy costs.

## 5. Concluding remarks

128.     Recent OECD work has investigated the impact of policies on macroeconomic stability, but from a welfare perspective, it is economic stability of firms and household that matters. While microeconomic instability can reflect growth-generating processes of creative destruction, more micro-

level instability reduces welfare for a given rate of growth. This study has reviewed the evidence on how economic policies affect economic stability at the firm and household level.

129.     The literature review suggests the following lessons:

- Stringent employment protection cushions the transmission of output shocks to unemployment but increases its persistence since it impedes the reallocation process within and across firms, while active labour market programmes reduce employment volatility due to better search-match performance. On the other hand, better coordination, more centralisation and wider coverage of collective wage bargaining is associated with lower earnings and sales volatility.

- The tax and benefit system plays a key role in the transmission of output shocks to household disposable income. High and progressive labour taxes can exacerbate gross earnings fluctuations, while taxation and social transfers provide an automatic stabilisation of household disposable income.

- Deregulation of financial markets promotes innovation and facilitates access of firms and households to credit. While this helps firms and households to smooth consumption and investment it also exposes them to additional sources of risks and may amplify certain shocks. Financial deepening can also lead to excessive risk-taking and irrational behaviour, for instance, due to underestimation of disaster risks.

- Global financial market integration exerts ambiguous effects on stability. On the one hand, it improves risk sharing and diversification. On the other hand, it can synchronise and amplify shocks, but empirical investigations using micro-level data are scarce.

- Product market deregulation is generally associated with improved resource allocation process and reduced persistence of adverse shocks.

130.     The paper also presents preliminary evidence using an empirical approach based on the residual volatility (after controlling for firm and individual characteristics), which allows the investigation of direct impacts of policies and institutions on volatility across countries and time. Further research is needed since simple correlations ma y be spurious or subject to reverse causality. An analytical framework and more sophisticated econometric techniques will be necessary to address endogeneity and omitted variable issues.

# BIBLIOGRAPHY

Acemoglu, D., A. Ozdaglar and A. Tahbaz-Salehi (2013), "The Network Origins of Large Economic Downturns", *NBER Working Paper No. 19230*, National Bureau of Economic Research.

Acemoglu, D., V. M. Carvalho, A. Ozdaglar and A. Tahbaz-Salehi (2012), "The Network Origins of Aggregate Fluctuations", *Econometrica*, Vol. 80, No. 5, pp. 1977-2016.

Acharya, V. V., Y. Amihud and L. Litov (2011), "Creditor Rights and Corporate Risk-Taking", *Journal of Financial Economics*, Vol. 102, No. 1, pp. 150-166.

Amiti, M. and D. E. Weinstein (2013), "How much do Bank Shocks Affect Investment? Evidence from Matched Bank-Firm Loan Data", *National Bureau of Economic Research*, No. w18890.

Anger, S. (2007), "The Cyclicality of Effective Wages within Employer-employee Matches. Evidence from German Panel Data", *European Central Bank Working Paper Series,* No 783 /July 2007.

Aparicio Fenoll, A. (2011), "The Effect of Product Market Competition on Job Instability", *IZA Discussion Papers,* No. 5669*, Institute for the Study of Labor (IZA).*

Attanasio, O., and S. J. Davis (1996), "Relative Wage Movements and the Distribution of Consumption", *Journal of Political Economy*, Vol. 104, No. 6, pp. 1227-1262.

Attanasio, O.P. and G. Weber (2010), "Consumption and Saving: Models of Intertemporal Allocation and Their Implications for Public Policy", *Journal of Economic Literature, American Economic Association,* Vol. 48, No. 3, pp. 693-751.

Auerbach, A. J., and Y. Gorodnichenko (2012), "Measuring the Output Responses to Fiscal Policy", *American Economic Journal: Economic Policy*, Vol. 4, No. 2, pp. 1-27.

Babecký, J., P. Du Caju, T. Kosma, M. Lawless, J. Messina and T. Rõõm (2010), "Downward Nominal and Real Wage Rigidity: Survey Evidence from European Firms," *Scandinavian Journal of Economics*, Vol. 112, No. 4, pp. 884-910.

Baker, M. and G. Solon (2003), "Earnings Dynamics and Inequality among Canadian Men, 1976-1992: Evidence from Longitudinal Income Tax Records", *Journal of Labor Economics, University of Chicago Press,* Vol. 21(2), pp. 267-288, April.

Balleer, A., B. Gehrke, W. Lechthaler and C. Merkl (2013), "Does Short-Time Work Save Jobs? A Business Cycle Analysis", *IZA Discussion Papers*, 7475, Institute for the Study of Labor (IZA).

Banks, J., R. Blundell and A. Brugiavini (2001), "Risk Pooling, Precautionary Saving and Consumption Growth.", *The Review of Economic Studies*, Vol. 68, No. 4, pp. 757-779.

Bartels, C. and T. Bonke (2013), "Can Household and Welfare States Mitigate Rising Earnings Instabillity?", *Review of Income and Wealth*, Vol. 59, No. 2, pp. 250-282.

Bartelsman, E. J., P. A. Gautier and J. De Wind (2013), "Employment Protection, Technology Choice, and Worker Allocation", *The Quarterly Journal of Economics*, Vol. 128, No. 1, pp. 249-85.

Bassanini, A. (2011), "Aggregate Earnings and Macroeconomic Shocks: The Role of Labour Market Policies and Institutions", *OECD Social, Employment and Migration Working Papers*, No. 123, OECD Publishing.

Bassanini, A. and A. Garnero (2013), "Dismissal Protection and Worker Flows in OECD Countries: Evidence from Cross-Country/Cross-Industry Data", *Labour Economics,* Vol. 21, pp. 25-41.

Bassanini, A., A. Garnero, P. Marianna and S. Martin. (2010), "Institutional Determinants of Worker Flows: A Cross-Country/Cross-Industry Approach", *OECD Social, Employment and Migration Working Papers*, No. 107, OECD Publishing.

Bassanini, A. and G. Brunello (2010), "Barriers to Entry, Deregulation and Workplace Training: A theoretical Model with Evidence from Europe", *CESifo Working Paper Series 2945, CESifo Group Munich.*Beach, C., R. Finnie and D. Gray (2003), "Earnings Variability and Earnings Instability of Women and Men in Canada: How Do the 1990s Compare to the 1980s?," *Canadian Public Policy, University of Toronto Press,* Vol. 29(s1), pp. 41-64.

Beach, C., R. Finnie and D. Gray (2010), "Long-Run Inequality and Annual Instability of Men's and Women's Earnings in Canada", *Review of Income and Wealth, International Association for Research in Income and Wealth,* Vol. 56, No. 3, pp. 572-596.

Bekaert, G., C. Harvey and C. Lundblad, (2006), "Growth Volatility and Financial Liberalization*", Journal of International Money and Finance,* Vol. 25, pp. 370-403.

Benmelech, E., N. Bergman and A. Seru, (2011),"Financing Labor," *NBER Working Papers,* No. 17144, National Bureau of Economic Research.

Bentolila, S., and G. Bertola, (1990), "Firing Costs and Labor Demand; How Bad is Eurosclerosis," *Review of Economic Studies,* Vol. 57, pp. 381-402.

Bentolila, S., P. Cahuc, J. J. Dolado and T. Le Barbanchon (2012), "Two-Tier Labor Markets in the Great Recession: France vs. Spain", *The Economic Journal*, Vol. 122, No. 562, F155-F187.

Bernanke, B., and M. Gertler (1989), "Agency Costs, Net Worth, and Business Fluctuations", *American Economic Review*, Vol. 79, No. 1, pp. 14-31.

Bhagwati, J. (1995), "Trade and Wages: Choosing Among Alternative Explanations", *Economic Policy Review*, Federal Reserve Bank of New York, pp. 42-47.

Blanchard, O. and J. Simon (2001), "The Long and Large Decline in US Output Volatility", *Brookings Papers on Economic Activity*, Vol. 2001, No. 1, pp. 135-174.

Blanchard, O. J. and D. Leigh (2013), "Growth Forecast Errors and Fiscal Multipliers", *NBER Working Paper Series*, No. 18779.

Blanchard, O. J. and J. Galí (2010), "Labor Markets and Monetary Policy: a New Keynesian Model with Unemployment", *American Economic Journal: Macroeconomics*, 2(2): pp. 1-30.

Blanchard, O. J. and L. H. Summers (1987), "Hysteresis in Unemployment", *European Economic Review*, Vol. 31, No. 1, pp. 288-295.

Bloom, N. (2009), "The Impact of Uncertainty Shocks", *Econometrica*, Vol. 77, No. 3, pp. 623-685.

Blundell R, L. Pistaferri L and I. Preston (2008), "Consumption Inequality and Partial Insurance", *American Economic Review*, Vol. 98, No. 5, pp. 1887-1921.

Brochu, P. (2013), "The Source of the New Canadian Job Stability Patterns", *Canadian Journal of Economics / Revue canadienne d'Economique,* Vol. 46, No. 2.

Browning, M. and T. Crossley (2001), "The Life-Cycle Model of Consumption and Saving," *Journal of Economic Perspectives,* Vol. 15, No. 3, pp. 3-22.

Buch C. and S. Yener (2010), "Consumption Volatility and Financial Openness", *Applied Economics, Taylor and Francis Journals*, Vol. 42, No. 28, pp. 3635-3649.

Buch, C. and C. Pierdzioch (2013), "Labor Market Volatility, Skills, and Financial Globalization", *Macroeconomic Dynamics,* pp. 1-30.

Buch, C. M. (2008), "The Great Risk Shift? Income Volatility in an International Perspective", *CESifo Working Paper*, No. 2465.

Buch, C. M., J. Döpke and H. Strotmann (2009a), "Does Export Openness Increase Firm-level Output Volatility?", *The World Economy*, Vol. 32, No. 4, pp. 531-551.

Buch, C. M., J. Döpke and K. Stahn (2009b), "Great Moderation at the Firm Level? Unconditional vs. Conditional Output Volatility", *The BE Journal of Economic Analysis & Policy*, Vol. 9, No. 1, Art. 20.

Bryson, A., R. Freeman, C. Lucifora, M. Pellizzari and V. Perotin (2013), "Paying for Performance: Incentive Pay Schemes and Employees' Financial Participation", in Boeri, T., C. Lucifora and K.J. Murphy (eds), *Executive Remuneration and Employee Performance-related Pay: A Transatlantic Perspective, Oxford University Press.*

Caballero, R. J., K. N. Cowan, E. M. Engel and A. Micco (2004), "Effective Labor Regulation and Microeconomic Flexibility", *National Bureau of Economic Research*, No. w10744.

Cahuc, P, O. Charlot and F. Malherbet (2012), "Explaining the Spread of Temporary Jobs and its Impact on Labor Turnover", *Institute for the Study of Labor (IZA) Discussion Papers*, No. 6365.

Cahuc, P. and S. Carcillo (2011), "Is Short-time Work a Good Method to Keep Unemployment Down?", *C.E.P.R. Discussion Papers*, No. 8214.

Calderon, C., N. Loayza, and K. Schmidt-Hebbel (2004), "Openness, Vulnerability, and Growth", *Paper prepared for the eighth annual conference of the Central Bank of Chile on "External Financial Vulnerability and Preventive Policies",* Santiago, Chile.

Caliendo M, K. Tatsiramos and A. Uhlendorff (2012), "Benefit Duration, Unemployment Duration and Job Match Quality: A Regression-Discontinuity Approach", *Journal of Applied Econometrics*. Vol. 28, No. 4, pp. 604-627.

Cappellari, L. and S. Jenkins (2013) "Earnings and Labour Market Volatility in Britain," *Institute for the Study of Labor (IZA) Discussion Papers*, No. 7491.

Carroll, C. D., K. E. Dynan and S. D. Krane (2003), "Unemployment Risk and Precautionary Wealth: Evidence from Households' Balance Sheets", *Review of Economics and Statistics*, Vol. 85, No. 3, pp. 586-604.

Carvalho, V. and X. Gabaix (2013), "The Great Diversification and Its Undoing", *American Economic Review*, Vol. 103, No. 5, pp. 1697-1727.

Cecchetti, S.G., A. Flores-Lagunes and S. Krause (2005), "Assessing the Sources of Changes in the Volatility of Real Growth", *RBA Annual Conference Volume, in: Christopher Kent & David Norman (ed.), The Changing Nature of the Business Cycle,* Reserve Bank of Australia.

Celik, S., C. Juhn, K. McCue and J. Thompson (2012), "Recent Trends in Earnings Volatility: Evidence from Survey and Administrative Data", *The B.E. Journal of Economic Analysis & Policy*, Vol. 12, No. 2, pp. 1-26.

Centeno, M. and Á. A. Novo (2012), "Excess Worker Turnover and Fixed-Term Contracts: Causal Evidence in a Two-Tier System", *Labour Economics*, Vol. 19, No. 3, pp. 320-328.

Céspedes, L.F. and A. Velasco (2012), "Macroeconomic Performance during Commodity Price Booms and Busts", *NBER Working Papers,* No. 18569.

Chava, S., and A. Purnanandam (2011), "The Effect of Banking Crisis on Bank-Dependent Borrowers", *Journal of Financial Economics*, Vol. 99, No. 1, pp. 116-135.

Chodorow-Reich, G. (2013), "The Employment Effects of Credit Market Disruptions: Firm-Level Evidence from the 2008-09 Financial Crisis", *Mimeo, UC Berkeley*.

Chun, H., J. W. Kim and R. Morck (2011), "Varying Heterogeneity among US Firms: Facts and Implications", *Review of Economics and Statistics*, Vol. 93, No. 3, pp. 1034-1052.

Cochrane, J. H. (1991), "A Simple Test of Consumption Insurance", *Journal of Political Economy*, Vol. 99, No. 5, pp. 957-976.

Cogan, J. F., T. Cwik, J. B. Taylor and V. Wieland (2010), "New Keynesian Versus Old Keynesian Government Spending Multipliers", *Journal of Economic Dynamics and Control*, Vol. 34, No. 3, pp. 281-295.

Comin, D. A. and T. Philippon (2006), "The Rise in Firm-Level Volatility: Causes and Consequences", *NBER Macroeconomics Annual 2005*, Vol. 20, pp. 167-228.

Comin, D. and S. Mulani (2006), "Diverging Trends in Aggregate and Firm Volatility", *The Review of Economics and Statistics*, Vol. 88, No. 2, pp. 374-383.

Comin, D. and S. Mulani (2009), "A Theory of Growth and Volatility at the Aggregate and Firm Level", *Journal of Monetary Economics*, Vol. 56, No. 8, pp. 1023–1042.

Comin, D., E. L. Groshen and B. Rabin (2009), "Turbulent Firms, Turbulent Wages?", *Journal of Monetary Economics*, Vol. 56, pp. 109-133.

Congregado, E., A., A. Golpe and S. C. Parker (2012), "The Dynamics of Entrepreneurship: Hysteresis, Business Cycles and Government Policy", *Empirical Economics*, Vol. 43, No. 3, pp. 1239-1261.

Congressional Budget Office (2007), "Trends in Earnings Variability Over the Past 20 Years", Washington.

Correa, R., and G. A. Suarez (2009), "Firm Volatility and Banks: Evidence from US Banking Deregulation", *Federal Reserve Board Finance and Economics Discussion Series*, No. 2009-46.

Corsetti, G., A. Meier and G. J. Müller (2012), "What Determines Government Spending Multipliers?", *Economic Policy*, Vol. 27, No. 72, pp. 521-565.

Costain, J., J. Jimeno, and C. Thomas, C. (2010), "Employment Fluctuations in a Dual Labor Market," *Banco de Espana Working Papers*, No. 1013.

Crépon, B., M. Ferracci and D. Foougère (2012), "Training the Unemployed in France: How Does it Affect Unemployment Duration and Recurrence?", *Annuals of Economics and Statistics*, Vol. 107-108, pp. 175-199.

Cunat, V. and M. Guadalupe (2006), "Globalization and the Provision of Incentives Inside the Firm", *Journal of Labor Economics,* Vol. 27, No. 2, pp. 179-212.

Cuñat, A. and M. J. Melitz (2012), "Volatility, Labor Market Flexibility, and the Pattern of Comparative Advantage", *Journal of the European Economic Association*, Vol. 10, No. 2, pp. 225-254.

Dabla-Norris, E. and N. Srivisal (2013), "Revisiting the Link between Finance and Macroeconomic Volatility", *IMF Working Paper*, No. 13/29.

Dahl, M., T. DeLeire, and J. A. Schwabisch (2011), "Estimates of Year-To-Year Volatility in Earnings and in Household Incomes from Administrative, Survey, and Matched Data", *Journal of Human Resources*, Vol. 46, No. 4, pp. 750–774.

Darbey, J. and J. Melitz (2008), "Social Spending and Automatic Stabilizers in the OECD", *Economic Policy*, Vol. 23, No. 56, pp. 715-756.

Davis, S. J. and J. A. Kahn (2008), "Interpreting the Great Moderation: Changes in the Volatility of Economic Activity at the Macro and Micro Levels", *The Journal of Economic Perspectives*, Vol. 22, No. 4, pp. 155-180.

Davis, S. J. and P. Willen (2000), "Occupation-Level Income Shocks and Asset Returns: Their Covariance and Implications for Portfolio Choice," *NBER Working Papers*, No. 7905.

Davis, S. J., J. Haltiwanger, R. Jarmin and J. Miranda (2007), "Volatility and Dispersion in Business Growth Rates: Publicly Traded Versus Privately Held Firms", *NBER Macroeconomics Annual 2006*, Vol. 21, pp. 107-180.

de Serres, A. and F. Murtin (2013), "Do Policies that Reduce Unemployment Raise its Volatility?: Evidence from OECD Countries", *OECD Economics Department Working Papers*, No. 1020, OECD Publishing.

de Veirman, E. and A. T. Levin (2011), "Cyclical Changes in Firm Volatility.", *CAMA Working Paper Series*.

DeLong, J. B., L. H. Summers, M. Feldstein and V. A. Ramey (2012), "Fiscal Policy in a Depressed Economy", *Brookings Papers on Economic Activity*, pp. 233-297.

Dickens, R. (2000), "The Evolution of Individual Male Earnings in Great Britain: 1975-95," *Economic Journal, Royal Economic Society,* Vol. 110, No. 460, pp. 27-49.

Duval, R., J. Elmeskov and L. Vogel (2007), "Structural Policies and Economic Resilience to Shocks", *OECD Economics Department Working Papers*, No. 567, OECD Publishing.

Dynan, K. E. (2012a), "Is a Household Debt Overhang Holding back Consumption?", *Brookings Papers on Economic Activity*, Spring, pp. 299-344.

Dynan, K. E., D. W. Elmendorf and D. Sichel (2012b), "The Evolution of Household Income Volatility", *The B.E. Journal of Economic Analysis & Policy*, Vol. 12, No. 2 (Advances), Article 3.

Dynan, K. E., D. W. Elmendorf and D. E. Sichel (2006), "Can Financial Innovation Help to Explain the Reduced Volatility of Economic Activity?", *Journal of Monetary Economics*, Vol. 53, No. 1, pp. 123-150.

Dynarski, S. and J. Gruber (1997), "Can Families Smooth Variable Earnings?", *Brookings Papers on Economic Activity*, Vol. 28, No. 1, pp. 229-303.

Easterly, W., R. Islam, and J.E. Stiglitz (2001), "Shaken and Stirred: Explaining Growth Volatility", *Annual World Bank Conference on Development Economics 2000,* pp. 191–211.

Eggertsson, G. B. and P. Krugman (2012), "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach", *The Quarterly Journal of Economics*, Vol. 127, No. 3, pp. 1469-1513.

Elsby, M., B. Hobijn and A. Şahin (2013), "Unemployment Dynamics in the OECD", *Review of Economics and Statistics*, Vol. 95, No. 2, pp. 530-548.

Epaulard, A. and A. Pommeret (2003), "Recursive Utility, Endogenous Growth, and the Welfare Cost of Volatility", *Review of Economic Dynamics*, Vol. 6, No. 3, pp. 672-684.

Faberman, J. (2012), "Job Flows, Jobless Recoveries, and the Great Moderation," *Federal Reserve Bank of Chicago.*

Fama, E. F. and K. R. French (2004), "New Lists: Fundamentals and Survival Rates.", *Journal of Financial Economics*, Vol. 73, No. 2, pp. 229-269.

Fort, T. C., J. Haltiwanger, R. Jarmin and J. Miranda (2013), "How Firms Respond to Business Cycles: The Role of Firm Age and Firm Size", *NBER Working Paper*, No. 19134.

Gabaix, X. (2011), "The Granular Origins of Aggregate Fluctuations," *Econometrica*, Vol. 79, No. 3, pp. 733-772.

Gal, P. N. (2013), "Measuring Total Factor Productivity at the Firm Level using ORBIS", *OECD Economics Department Working Papers*, No. 1049, OECD Publishing.

Gal, P., A. Hijzen and Z. Wolf (2012), "The Role of Institutions and Firm Heterogeneity for Labour Market Adjustment: Cross-Country Firm-Level Evidence", *OECD Social, Employment and Migration Working Papers*, No. 134, OECD Publishing.

Gan, J. (2007), "The Real Effects of Asset Market Bubbles: Loan- and Firm-Level Evidence of a Lending Channel", *Review of Financial Studies*, Vol. 20, No. 5, pp. 1941-1973.

Gao, X., J. R. Ritter and Z. Zhu (2013), "Where Have all the IPOs Gone?", *Working Paper, University of Florida*.

Gartner, H., C. Merkl and T. Rothe (2012), "Sclerosis and Large Volatilities: Two Sides of the Same Coin", *Economics Letters,* Vol. 117(1), pp. 106-109.

Gertler, M. and P. Karadi (2011), "A Model of Unconventional Monetary Policy", *Journal of Monetary Economics*, Vol. 58, No. 1, pp. 17-34.

Giesecke, M., T. Bönke and H. Lüthen (2011), "The Dynamics of Earnings in Germany: Evidence from Social Security Records", *Annual Conference 2011 (Frankfurt, Main): The Order of the World Economy - Lessons from the Crisis,* Verein für Socialpolitik / German Economic Association.

Givord, P. and E. Maurin (2004), "Changes in Job Security and their Causes: An Empirical Analysis for France, 1982-2002", *European Economic Review*, Vol. 48, No. 3, pp. 595-615.

Goodhart, C. A., A. K. Kashyap, D. P. Tsomocos and A. P. Vardoulakis (2012), "Financial Regulation in General Equilibrium", *NBER Working Paper*, No. 17909.

Gorbachev, O. (2011), "Did Household Consumption Become More Volatile*?", American Economic Review,* Vol. 101, No. 5, pp. 2248-70.

Gottschalk, P. and R. Moffitt (1994), "The Growth of Earnings Instability in the U.S. Labor Market", *Brookings Papers on Economic Activity*, Vol. 25, No. 2, pp. 217-272.

Gottschalk, P. and R. Moffitt (1999), "Changes in Job Instability and Insecurity Using Monthly Survey Data", *Journal of Labor Economics* , Vol. 17, No. S4 (October), pp. S91-S126

Gottschalk, P. and R. Moffitt (2009), "The Rising Instability of U.S. Earnings," *Journal of Economic Perspectives*, Vol. 23, No. 4, pp. 3-24.

Gourio, F. (2012), "Disaster Risk and Business Cycles", *American Economic Review*, Vol. 102, No. 6, pp. 2734-66.

Grant, C. (2010), "Evidence on the Insurance Effect of Bankruptcy Exemptions", *Journal of Banking & Finance*, Vol. 34, No. 9, pp. 2247-2254.

Greenstone, M. and A. Mas (2012), "Do Credit Market Shocks Affect the Real Economy? Quasi-Experimental Evidence from the Great Recession and 'Normal' Economic Times", *MIT Department of Economics Working Paper*, No. 12-27.

Griffith, R., R. Harrison and G. Macartney, (2007), "Product Market Reforms, Labour Market Institutions and Unemployment", *The Economic Journal*., Vol. 117, No. 519, pp. C142-C166.

Gruber, J. (1997), "The Consumption Smoothing Benefits of Unemployment Insurance", *American Economic Review*, Vol. 87, No. 1, pp. 192-205.

Guadalupe, M. (2007), "Product Market Competition, Returns to Skill, and Wage Inequality", *Journal of Labor Economics,* Vol. 25, pp. 439-474.

Guiso, L., L. Pistaferri and F. Schivardi (2013), "Credit within the Firm," *Review of Economic Studies*, Vol. 80, No. 1, pp. 211-247.

Guiso, L., M. Haliassos and T. Jappelli (2003), "Equity Culture: Theory and Cross-Country Evidence", *Economic Policy*, Vol. 18, No. 36, pp. 123-170.

Guiso, L., T. Jappelli and D. Terlizzese (1996), "Income Risk, Borrowing Constraints, and Portfolio Choice", *American Economic Review*, Vol. 86, No. 1, pp. 158-172.

Hällsten, M., T. Korpi and M. Tåhlin (2010), "Globalization and Uncertainty: Earnings Volatility in Sweden, 1985–2003", *Industrial Relations: A Journal of Economy and Society*, Vol. 49, No. 2, pp. 165-189.

Haltiwanger, J., S. Scarpetta and H. Schweiger (2008), "Assessing Job Flows Across Countries: The Role of Industry, Firm Size and Regulations", *National Bureau of Economic Research*, No. w13920.

Hardy, B. (2012), "Income Instability and the Response of the Safety Net", *Department of Public Administration & Policy of the American University.*

Hart, R. (2004), "The Economics of Overtime Working", *Cambridge University Press, Cambridge*

Hart, R. and E. Roberts (2013) "Industrial Composition, Methods of Compensation and Real Earnings in the Great Depression", *National Institute Economic Review,* Vol. 226, No. 1 R17-R29

Higson, C., S. Holly, P. Kattuman and S. Platis (2004), "The Business Cycle, Macroeconomic Shocks and the Cross-Section: The Growth of UK Quoted Companies", *Economica*, Vol. 71, No. 282, pp. 299-318.

Hijzen A. and S. Martin (2013), "The Role of Short-Time Work Schemes during the Global Financial Crisis and Early Recovery: A Cross-Country Analysis", *IZA Journal of Labor Policy*, Vol. 2, No. 1, pp. 1-31.

Hurst, E. and F. Stafford (2004), "Home Is Where the Equity Is: Mortgage Refinancing and Household Consumption," *Journal of Money, Credit and Banking*, Vol. 36, No. 6, pp. 985-1014.

Ilzetzki, E., E. G. Mendoza and C. A. Végh (2012), "How Big (Small?) Are Fiscal Multipliers?", *Journal of Monetary Economics*, Vol. 60, pp. 239-254.

Irvine, P. J. and J. Pontiff (2009), "Idiosyncratic Return Volatility, Cash Flows, and Product Market Competition", *Review of Financial Studies*, Vol. 22, No. 3, pp. 1149-1177.

Jappelli, T. and L. Pistaferri (2003), "Tax Incentives to Saving and Borrowing", *CEPR Discussion Papers* No. 3881.

Jappelli, T. and L. Pistaferri (2010), "The Consumption Response to Income Changes*", Annual Review of Economics, Annual Reviews,* Vol. 2, No. 1, pp. 479-506.

Jappelli, T., and L. Pistaferri (2011), "Financial Integration and Consumption Smoothing", *Economic Journal*, Vol. 121, No. 553, pp. 678-706.

Jeanne, O. and A. Korinek (2013), "Macroprudential Regulation Versus Mopping Up after the Crash", *NBER Working Paper*, No. w18675.

Jermann, U. and V. Quadrini (2006), "Financial Innovations and Macroeconomic Volatility", *NBER Working Paper Series*, No. 12308.

Joumard, I., M. Pisu and D. Bloch (2012), "Tackling Income Inequality: The Role of Taxes and Transfers", *OECD Journal: Economic Studies*, Vol. 2012, No. 1, pp. 37-70.

Kaplan, G. (2012), "Moving Back Home: Insurance Against Labor Market Risk", *Journal of Political Economy,* Vol. 120, No. 3, pp. 446-512.

Kelly, B., H. Lustig and S. Van Nieuwerburgh (2013), "Firm Volatility in Granular Networks", *Fama-Miller Working Paper; Chicago Booth Research Paper*, No. 12-56.

Kniesner, T. and J.P. Ziliak (2002), "Explicit versus Implicit Income Insurance", *Journal of Risk and Uncertainty,* Vol. 25, No. 1, pp. 5-20.

Kose, M., E. Prasad and M. Terrones (2009), "Does Financial Globalization Promote Risk Sharing?", *Journal of Development Economics*, Vol. 89, pp. 258-270.

Kose, M., E. Prasad, and M. Terrones (2003), "Financial Integration and Macroeconomic Volatility", *IMF Staff Papers, Special Issue,* Vol. 50, pp. 119-141.

Koske, I., J. Fournier and I. Wanner (2012), "Less Income Inequality and More Growth – Are They Compatible? Part 2. The Distribution of Labour Income", *OECD Economics Department Working Papers*, No. 925, OECD Publishing.

Krueger, D. and F. Perri (2006), "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory", *Review of Economic Studies*, Vol. 73, No. 1, pp. 163-193.

Kuebler, F., and K. Schmedders (2012), "Financial Innovation and Asset Price Volatility", *American Economic Review Papers & Proceedings*, Vol. 102, No. 3, pp. 147-151.

Larrain, B. (2006), "Do Banks Affect the Level and Composition of Industrial Volatility?", *Journal of Finance*, Vol. 61, No. 4, pp. 1897-1925.

Lechner M., R. Miquel and C. Wunsch (2011), "Long-run Effects of Public Sector Sponsored Training in West Germany", *Journal of the European Economic Association*, Vol. 9, No. 4, pp. 742-784.

Lin, C., Y. Ma, P. Malatesta and Y. Xuan (2011), "Ownership Structure and the Cost of Corporate Borrowing", *Journal of Financial Economics*, Vol. 100, No. 1, pp. 1-23.

Ljungqvist, L. and T. J. Sargent (1998), "The European Unemployment Dilemma.", *Journal of Political Economy*, Vol. 106, No. 3, pp. 514-550.

Low, H., C. Meghir and L. Pistaferri (2010), "Wage Risk and Employment Risk over the Life Cycle", *The American Economic Review*, Vol. 100, No. 4, pp. 1432-1467.

Lucas, R. E. (2003), "Macroeconomic Priorities", *American Economic Review*, Vol. 93, No. 1, pp. 1-14.

Lemieux, T., W. MacLeod and D. Parent (2012), "Performance Pay and the Autocovariance Structure of Earnings and Hours", mimeo.

McCarthy, J. and E. Zakrajšek (2007), "Inventory Dynamics and Business Cycles: What Has Changed?", *Journal of Money, Credit and Banking*, Vol. 39, No. 2-3, pp. 591-613.

McManus, P. and T. DiPrete (2000), "Market, Family, and State Sources of Income Instability in Germany and the United States", *Social Science Research,* Vol. 29, pp. 405-440.

Mendoza, E. and M. Terrones (2008), "An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data," *FRB International Finance Discussion Paper*, No. 936.

Mian, A., K. Rao and A. Sufi (2013), "Household Balance Sheets, Consumption, and the Economic Slump", *University of Chicago Booth School of Business Working Paper*.

Moffitt, R. and P. Gottschalk (2012), "Trends in the Transitory Variance of Male Earnings: Methods and Evidence", *Journal of Human Resources*, Vol. 47, No. 1, pp. 204-236.

Musgrave, R. A. (1939), "The Voluntary Exchange Theory of Public Economy", *The Quarterly Journal of Economics*, Vol. 53, No. 2, pp. 213-237.

OECD (2009), *OECD Employment Outlook 2009*, OECD Publishing.

OECD (2010), *OECD Employment Outlook 2010*, OECD Publishing.

OECD (2012), *OECD Employment Outlook 2012*, OECD Publishing.

OECD (2013), *Economic Policy Reforms 2013: Going for Growth*, OECD Publishing.

Ohanian, L. E. and A. Raffo (2011), "Aggregate Hours Worked in OECD Countries: New Measurement and Implications for Business Cycles", *NBER Working Paper,* No. 17420.

Oikawa, K. (2013), "Cyclical Behavior of Firm-level Volatility: An Explanation for the Contrast between the United States and Japan", *Journal of Macroeconomics*, forthcoming.

Ostrovsky, Y. (2010), "Long-Run Earnings Inequality and Earnings Instability among Canadian Men Revisited, 1985-2005", *The B.E. Journal of Economic Analysis & Policy,* Vol. 10, No. 1, pp. 1-34.

Paciorek, A. (2013), "The Long and the Short of Household Formation", *Finance and Economics Discussion Series,* Division of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C.

Papageorgiou, T. (2013), "Learning Your Comparative Advantages", *The Review of Economic Studies*, forthcoming.

Park, K. and D. Shin (2010), "How Do Families Smooth Household Heads' Earnings Volatility?", *Journal of Economic Research*, Vol. 15, No. 1, pp. 79-97.

Pesaran, M. H. (2006), "Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure", *Econometrica*, Vol. 74, No. 4, pp. 967-1012.

Petrosky-Nadeau, N. and E. Wasmer (2013), "The Cyclical Volatility of Labor Markets under Frictional Financial Markets," *American Economic Journal: Macroeconomics,* Vol. 5, No. 1, pp. 193-221.

Philippon, T. (2003), "An Explanation for the Joint Evolution of Firm and Aggregate Volatility", *Working Paper,* New York University.

Pissarides, C. A. (1992), "Loss of Skill During Unemployment and the Persistence of Employment Shocks", *The Quarterly Journal of Economics*, Vol. 107, No. 4, pp. 1371-1391.

Prendergast, C. (1999), "The Provision of Incentives in Firms", *Journal of Economic Literature,* Vol. 37, No. 1, pp. 7-63.

Poschke, M. (2009), "Employment Protection, Firm Selection, and Growth.", *Journal of Monetary Economics*, Vol. 56, No. 8, pp. 1074-1085.

Ramey, V. A. (2011), "Identifying Government Spending Shocks: It's all in the Timing", *The Quarterly Journal of Economics*, Vol. 126, No. 1, pp. 1-50.

Reinhart, C. M. and K. S. Rogoff (2008), "This Time is Different: A Panoramic View of Eight Centuries of Financial Crises", *National Bureau of Economic Research*, No. w13882.

Rodrik, D. (1997), "Has Globalization Gone Too Far?", Institute for International Economics, Washington, DC., mimeograph.

Sabelhaus, J. and J. Song (2010), "The Great Moderation in Micro Labour Earnings", *Journal of Monetary Economics,* Vol. 57, No 4, pp. 391-40.

Sala, H., Silva, J. and M. Toledo (2012), "Flexibility at the Margin and Labor Market Volatility in OECD Countries", *Scandinavian Journal of Economics,* Vol. 114, No. 3, pp. 991-1017.

Schularick, M. and A. M. Taylor. (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", *The American Economic Review*, Vol. 102, No. 2, pp. 1029-1061.

Shin, D. and G. Solon (2007), "New Evidence on Real Wage Cyclicality within Employer-Employee Matches", *Scottish Journal of Political Economy,* Vol. 54, No. 5, pp. 648-660.

Shin, D. and G. Solon (2011), "Trends in Men's Earnings Volatility: What Does the Panel Study of Income Dynamics Show?", *Journal of Public Economics,* Vol. 95, No.7-8, pp. 973-982.

Shleifer, A. and R. Vishny (2011), "Fire Sales in Finance and Macroeconomics", *The Journal of Economic Perspectives*, Vol. 25, No. 1, pp. 29-48.

Sologon D. and C. O'Donoghue (2011), "Shaping Earnings Instability: Labour Market Policy and Institutional Factors", *UNU-MERIT Working Papers*, No. 2011-077.

Stiroh, K. J. (2009), "Volatility Accounting: A Production Perspective on Increased Economic Stability", *Journal of the European Economic Association*, Vol. 7, No. 4, pp. 671-696.

Stock, J. H. and M. W. Watson (2003), "Has the Business Cycle Changed and Why?", *NBER Macroeconomics Annual 2002*, Vol. 17, pp. 159-230.

Strain, M. (2011), "Understanding Earnings Instability: Skill and Firm Instability", *Mimeo*.

Strain, M. (2013), "Do Volatile Firms Pay Volatile Earnings? Evidence Using Linked Worker-Firm Data", *AEI Economic Policy Working Paper,* No. 2013-01.

Sutherland, D. and P. Hoeller (2013), "Growth-Promoting Policies and Macroeconomic Stability", *OECD Economics Department Working Papers*, No. 1091, OECD Publishing.

Tatsiramos, K. (2009), "Unemployment Insurance in Europe: Unemployment Duration and Subsequent Employment Stability", *Journal of the European Economic Association*, Vol. 7, No. 6, pp. 1225–1260.

Thesmar, D. and M. Thoenig (2011), "Contrasting Trends in Firm Volatility", *American Economic Journal: Macroeconomics*, Vol. 3, No. 4, pp. 143-180.

Traca, D. A. (2005), "Trade Exposure, Export Intensity and Wage Volatility: Theory and Evidence", *Review of Economics and Statistics*, Vol. 87, No. 2, pp. 336-347.

Vannoorenberghe, G. (2012), "Firm-level Volatility and Exports", *Journal of International Economics*, Vol. 86, pp. 57-67.

Venn, D. (2011), "Earnings Volatility and its Consequences for Households", *OECD Social, Employment and Migration Working Papers,* No. 125, OECD Publishing.

Visser, J. (2011), "Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010 (ICTWSS)", *Amsterdam Institute for Advanced Labour Studies AIAS*, University of Amsterdam, Version, 3.

Winship, S. (2009). "Has There Been a Great Risk Shift? Trends in Economic Instability among Working-Age Adults," *Ph.D. dissertation,* Harvard University.

Winship, S. (2011), "Economic Instability Trends and Levels across Household Surveys", *National Poverty Center Working Paper,* #11-13, April.

Ziemann, V. (2013), "Do Structural Policies Affect Macroeconomic Stability?", *OECD Economics Department Working Papers*, No. 1075, OECD Publishing.

Ziliak, J., B. Hardy and C. Bollinger (2011), "Earnings and Income Volatility in America: Evidence from Matched CPS*", Labour Economics,* Vol. 18, No. 6, pp. 742-754.

# APPENDIX 1: OECD'S STAN INDUSTRY DATABASE

## Table A1. Sector volatilities

| | Base | Industry incl. Energy | | | Business Sector Services | | | Community, Social and Personal Services | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Base | 2003-07 | Change | Base | 2003-07 | Change | Base | 2003-07 | Change | Base | 2003-07 | Change |
| AUT | 1978-1982 | 2.4 | 2.9 | 20.3% | 3.6 | 1.5 | -57.1% | 0.8 | 0.3 | -67.0% | 1.7 | 1.6 | -4.7% |
| BEL | 1996-2000 | 5.3 | 4.4 | -15.7% | 1.1 | 1.7 | 53.7% | 1.4 | 0.4 | -68.7% | 2.2 | 2.3 | 4.8% |
| CAN | 1978-1982 | 8.0 | 2.6 | -67.5% | 3.1 | 1.2 | -62.5% | 2.0 | 0.7 | -66.4% | 4.7 | 1.0 | -78.4% |
| CHE | 1991-1995 | 1.7 | 3.6 | 110.5% | 1.7 | 2.7 | 64.3% | 1.9 | 0.5 | -75.2% | 0.7 | 2.5 | 264.3% |
| CZE | 1994-1998 | 4.0 | 5.5 | 37.1% | 2.5 | 2.8 | 10.1% | 4.5 | 1.5 | -66.3% | 3.5 | 2.8 | -19.7% |
| DEU | 1992-1996 | 4.3 | 2.8 | -34.3% | 1.8 | 0.7 | -64.3% | 2.5 | 0.4 | -85.8% | 1.9 | 1.6 | -17.7% |
| DNK | 1978-1982 | 2.3 | 4.4 | 89.1% | 2.0 | 3.1 | 58.7% | 0.2 | 0.6 | 157.3% | 1.2 | 2.8 | 140.2% |
| ESP | 1996-2000 | 2.5 | 2.0 | -18.2% | 0.8 | 0.8 | -7.9% | 1.5 | 0.7 | -53.1% | 1.6 | 1.2 | -23.4% |
| EST | 1994-1998 | 14.3 | 4.9 | -65.7% | 8.7 | 3.0 | -65.2% | 13.5 | 3.6 | -73.3% | 7.6 | 3.1 | -58.8% |
| FIN | 1978-1982 | 6.3 | 4.9 | -21.3% | 2.1 | 1.5 | -29.7% | 1.9 | 0.5 | -75.3% | 3.8 | 2.6 | -31.1% |
| FRA | 1978-1982 | 2.2 | 2.6 | 16.2% | 0.7 | 1.0 | 42.4% | 1.1 | 0.2 | -81.8% | 1.2 | 1.4 | 11.9% |
| GBR | 1990-1994 | 3.6 | 2.6 | -26.8% | 1.7 | 0.7 | -58.8% | 3.1 | 1.6 | -46.9% | 2.3 | 0.3 | -86.1% |
| GRC | 1996-2000 | 4.1 | 1.9 | -53.3% | 2.1 | 1.9 | -9.9% | 4.2 | 2.0 | -52.8% | 1.8 | 1.1 | -39.5% |
| HUN | 1992-1996 | 13.2 | 3.1 | -76.4% | 4.6 | 1.6 | -65.9% | 8.4 | 3.2 | -61.9% | 6.5 | 2.1 | -66.9% |
| IRL | 2001-2005 | 3.0 | 3.4 | 11.6% | 3.8 | 1.8 | -53.7% | 7.6 | 6.1 | -19.9% | 2.6 | 1.2 | -53.7% |
| ISL | 1978-1982 | 2.7 | 8.5 | 211.3% | 5.4 | 3.5 | -35.2% | 6.3 | 2.2 | -65.2% | 4.0 | 4.3 | 9.1% |
| ISR | 2001-2005 | 6.6 | 2.9 | -55.7% | 4.9 | 4.5 | -8.6% | 3.8 | 3.5 | -7.7% | 3.7 | 3.1 | -16.9% |
| ITA | 1978-1982 | 4.8 | 2.5 | -47.1% | 2.4 | 0.5 | -79.6% | 3.0 | 0.8 | -74.3% | 3.3 | 0.9 | -74.0% |
| JPN | 1978-1982 | 6.0 | 1.6 | -73.8% | 2.9 | 1.1 | -62.9% | 2.5 | 0.4 | -82.9% | 3.8 | 1.1 | -71.1% |
| KOR | 1978-1982 | 8.4 | 3.9 | -53.4% | 7.2 | 1.5 | -78.6% | 5.5 | 0.5 | -91.4% | 6.9 | 2.0 | -70.4% |
| LUX | 1986-1990 | 10.6 | 5.2 | -51.0% | 3.1 | 6.7 | 118.2% | 3.9 | 3.4 | -12.7% | 4.5 | 5.1 | 13.1% |
| MEX | 1989-1993 | 6.9 | 4.0 | -42.5% | 7.7 | 1.2 | -84.0% | 4.8 | 1.4 | -71.3% | 6.8 | 2.3 | -66.7% |
| NLD | 1978-1982 | 4.1 | 3.2 | -20.9% | 2.1 | 1.7 | -18.2% | 1.9 | 1.5 | -22.0% | 2.3 | 2.0 | -15.1% |
| NOR | 1978-1982 | 5.9 | 6.3 | 7.1% | 3.5 | 3.1 | -10.4% | 2.5 | 1.3 | -46.6% | 3.2 | 3.2 | -0.1% |
| NZL | 1978-1982 | 5.6 | 3.1 | -44.7% | 2.7 | 0.7 | -73.2% | 3.3 | 1.1 | -66.5% | 3.5 | 1.3 | -63.0% |
| POL | 1995-1999 | 9.8 | 5.2 | -47.6% | 6.5 | 3.2 | -50.6% | 9.3 | 1.9 | -79.6% | 8.4 | 3.5 | -58.6% |
| PRT | 1978-1982 | 5.8 | 2.5 | -57.6% | 1.6 | 1.1 | -34.6% | 3.1 | 1.4 | -56.0% | 2.9 | 1.4 | -49.9% |
| SVK | 1994-1998 | 3.8 | 5.5 | 42.7% | 3.4 | 3.3 | -3.9% | 8.0 | 2.6 | -66.7% | 2.4 | 3.3 | 34.8% |
| SVN | 1996-2000 | 5.6 | 2.3 | -59.7% | 2.5 | 2.8 | 13.1% | 2.0 | 1.1 | -47.4% | 2.5 | 2.5 | 1.7% |
| SWE | 1981-1985 | 3.2 | 2.7 | -14.5% | 1.8 | 1.9 | 5.7% | 1.1 | 1.3 | 19.6% | 1.9 | 1.9 | -0.7% |
| USA | 1988-1992 | 3.4 | 2.6 | -23.6% | 2.2 | 1.4 | -37.2% | 1.1 | 0.2 | -80.3% | 2.4 | 1.3 | -43.7% |
| Average | | | | -13.7% | | | -22.1% | | | -51.2% | | | -17.1% |

*Source:* OECD STAN database. Standard deviations of growth rates over 5-year windows are shown. The base periods corresponds to 1978-82 or first available period per country.

**Table A2. Sector shares**

| | Base | Industry incl. Energy | | | Business Sector Services | | | Community, Social and Personal Services | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Base | 2003-07 | Change | Base | 2003-07 | Change | Base | 2003-07 | Change |
| AUT | 1978-1982 | 40.3 | 33.5 | -16.9% | 31.7 | 41.9 | 32.2% | 14.4 | 15.2 | 5.9% |
| BEL | 1996-2000 | 34.4 | 32.4 | -5.9% | 43.2 | 44.9 | 3.9% | 14.1 | 14.7 | 4.2% |
| CAN | 1978-1982 | 38.7 | 34.3 | -11.3% | 30.6 | 38.2 | 25.0% | 17.0 | 17.5 | 2.6% |
| CHE | 1991-1995 | 33.4 | 31.7 | -5.2% | 41.0 | 45.6 | 11.1% | 15.4 | 15.2 | -1.2% |
| CZE | 1994-1998 | 44.2 | 45.4 | 2.7% | 31.9 | 33.2 | 3.9% | 10.2 | 10.4 | 1.8% |
| DEU | 1992-1996 | 36.3 | 38.2 | 5.2% | 37.9 | 39.5 | 4.2% | 16.6 | 16.4 | -1.4% |
| DNK | 1978-1982 | 31.3 | 25.4 | -18.8% | 35.2 | 45.2 | 28.1% | 19.1 | 19.7 | 3.3% |
| ESP | 1996-2000 | 34.5 | 30.4 | -12.0% | 37.2 | 37.6 | 1.1% | 14.3 | 14.2 | -0.8% |
| EST | 1994-1998 | 34.8 | 32.9 | -5.5% | 37.6 | 43.1 | 14.5% | 12.6 | 11.5 | -9.2% |
| FIN | 1978-1982 | 43.0 | 37.8 | -12.0% | 27.5 | 35.9 | 30.6% | 12.7 | 15.9 | 25.5% |
| FRA | 1978-1982 | 37.9 | 28.1 | -25.9% | 34.6 | 45.5 | 31.4% | 14.4 | 17.2 | 19.3% |
| GBR | 1990-1994 | 33.9 | 23.3 | -31.4% | 38.3 | 47.2 | 23.3% | 18.0 | 20.6 | 14.2% |
| GRC | 1996-2000 | 23.6 | 21.2 | -10.2% | 43.7 | 46.5 | 6.4% | 16.8 | 19.3 | 14.9% |
| HUN | 1992-1996 | 38.6 | 42.8 | 10.7% | 31.5 | 33.3 | 5.9% | 16.5 | 14.4 | -12.5% |
| IRL | 2001-2005 | 38.1 | 34.7 | -8.8% | 36.9 | 39.5 | 7.1% | 12.3 | 12.5 | 1.3% |
| ISL | 1978-1982 | 34.6 | 20.6 | -40.4% | 29.5 | 41.1 | 39.2% | 14.7 | 20.9 | 42.2% |
| ISR | 2001-2005 | 28.4 | 29.0 | 2.2% | 40.4 | 41.2 | 1.9% | 23.4 | 22.2 | -5.0% |
| ITA | 1978-1982 | 44.0 | 34.8 | -21.0% | 31.1 | 43.2 | 38.7% | 11.6 | 13.8 | 18.9% |
| JPN | 1978-1982 | 46.3 | 35.9 | -22.4% | 29.7 | 39.7 | 33.7% | 11.1 | 15.6 | 40.9% |
| KOR | 1978-1982 | 51.1 | 50.1 | -2.0% | 23.5 | 28.4 | 21.0% | 8.3 | 11.9 | 42.6% |
| LUX | 1986-1990 | 32.7 | 12.7 | -61.1% | 45.8 | 72.9 | 59.0% | 13.0 | 8.6 | -33.5% |
| MEX | 1989-1993 | 41.8 | 40.9 | -2.3% | 36.4 | 37.8 | 3.9% | 8.8 | 9.9 | 13.1% |
| NLD | 1978-1982 | 38.8 | 29.6 | -23.6% | 30.3 | 42.8 | 41.2% | 17.7 | 17.9 | 1.2% |
| NOR | 1978-1982 | 38.2 | 36.0 | -5.8% | 34.7 | 38.8 | 11.6% | 15.0 | 16.7 | 11.2% |
| NZL | 1978-1982 | 33.7 | 26.4 | -21.7% | 37.2 | 44.0 | 18.3% | 11.9 | 14.7 | 23.3% |
| POL | 1995-1999 | 37.1 | 37.6 | 1.2% | 35.0 | 38.1 | 9.0% | 12.4 | 12.3 | -1.3% |
| PRT | 1978-1982 | 42.7 | 30.3 | -28.9% | 30.0 | 38.9 | 29.6% | 8.8 | 18.0 | 104.0% |
| SVK | 1994-1998 | 43.0 | 46.9 | 9.1% | 32.8 | 31.8 | -3.1% | 10.4 | 10.1 | -3.4% |
| SVN | 1996-2000 | 39.7 | 38.9 | -1.9% | 33.3 | 34.9 | 4.9% | 13.9 | 13.5 | -2.3% |
| SWE | 1981-1985 | 36.2 | 33.8 | -6.5% | 35.5 | 40.6 | 14.3% | 17.3 | 18.9 | 9.1% |
| USA | 1988-1992 | 31.0 | 24.5 | -20.9% | 41.4 | 47.2 | 14.0% | 20.6 | 21.6 | 5.0% |
| Average | | 37.5 | 32.9 | -12.6% | 35.0 | 41.2 | 18.3% | 14.3 | 15.5 | 10.8% |

*Source*: OECD STAN database. Shares refer to nominal turnover and percentage points are given. Agriculture and construction are not reported.

58

# APPENDIX 2: ORBIS FIRM-LEVEL DATABASE

## Table A3. Availability of firm data by country (ORBIS)

| | Total firms in database | Firms with data from 2000-09 | Firms with data from 2004-09 | **Firms in final dataset[1]** | % of outliers | Firms in final dataset with valid VA data | % of valid VA data in final data set |
|---|---|---|---|---|---|---|---|
| AUS | 1,681 | 0 | 30 | - | - | - | - |
| AUT | 51,946 | 9 | 366 | - | - | - | - |
| BEL | 97,048 | 8,213 | 14,668 | **14,484** | 1.3% | 4,144 | 28.6% |
| BRA | 7,254 | 0 | 8 | - | - | - | - |
| CAN | 413 | 0 | 1 | - | - | - | - |
| CHE | 19,261 | 420 | 2,386 | **2,374** | 0.5% | 148 | 6.2% |
| CHL | 580 | 0 | 0 | - | - | - | - |
| CHN | 348,631 | 4 | 3,264 | **3,080** | 5.6% | 39 | 1.3% |
| CZE | 238,649 | 1,911 | 14,014 | **13,083** | 6.6% | 3,617 | 27.6% |
| DEU | 325,001 | 618 | 12,493 | **12,249** | 2.0% | 2,230 | 18.2% |
| DNK | 23,270 | 6 | 61 | - | - | - | - |
| ESP | 855,658 | 96,699 | 209,105 | **201,353** | 3.7% | 149,944 | 74.5% |
| EST | 43,774 | 0 | 11,792 | **11,211** | 4.9% | 0 | 0.0% |
| FIN | 94,383 | 3,024 | 12,282 | **11,821** | 3.8% | 4,063 | 34.4% |
| FRA | 1,804,873 | 43 | 84,074 | **83,075** | 1.2% | 27,238 | 32.8% |
| GBR | 153,247 | 6,891 | 18,188 | **17,679** | 2.8% | 5,412 | 30.6% |
| GRC | 30,785 | 320 | 12,945 | **12,426** | 4.0% | 0 | 0.0% |
| HUN | 145,864 | 2 | 167 | - | - | - | - |
| IND | 44 | 0 | 0 | - | - | - | - |
| IRL | 1,543 | 1 | 12 | - | - | - | - |
| ISL | 2,663 | 0 | 72 | - | - | - | - |
| ISR | 594 | 1 | 64 | - | - | - | - |
| ITA | 551,002 | 20,987 | 49,169 | **47,986** | 2.4% | 39,992 | 83.3% |
| JPN | 361,547 | 16,407 | 62,349 | **61,978** | 0.6% | 10,688 | 17.2% |
| KOR | 194,611 | 169 | 17,785 | **17,184** | 3.4% | 4,725 | 27.5% |
| LUX | 307 | 0 | 1 | - | - | - | - |
| MEX | 7,724 | 0 | 63 | - | - | - | - |
| NLD | 32,119 | 58 | 268 | - | - | - | - |
| NOR | 132,424 | 3 | 23 | - | - | - | - |
| NZL | 62 | 0 | 1 | - | - | - | - |
| POL | 90,478 | 3,842 | 8,609 | **8,452** | 1.8% | 2,499 | 29.6% |
| PRT | 282,610 | 117 | 620 | - | - | - | - |
| RUS | 430,025 | 0 | 57,134 | **52,564** | 8.0% | 0 | 0.0% |
| SVK | 118,776 | 254 | 1,176 | - | - | - | - |
| SVN | 14,782 | 2 | 4,890 | **4,820** | 1.4% | 1,222 | 25.4% |
| SWE | 273,680 | 29,611 | 102,956 | **99,515** | 3.3% | 40,931 | 41.1% |
| TUR | 10,605 | 0 | 0 | - | - | - | - |
| USA | 12,831,728 | 349 | 9,064 | **8,703** | 4.0% | 0 | 0.0% |
| ZAF | 216 | 0 | 2 | - | - | - | - |

*Note:* The final dataset consists of firms with sales and employment data at least from 2004-09 which allows to calculate the standard deviation of growth rates over the period 2005-09. Countries with less than 1000 of such firms in the final dataset are dropped. Among the remaining 20 countries, outliers, defined as firms experiencing extreme annual employment or sales movements (multiplied or divided by 10), are also dropped.

*Source:* ORBIS database (see Gal, 2013).

**Table 4.   Table A4. Firm characteristics by country**

|  | Size | | | Growth | | | Age | | |
|---|---|---|---|---|---|---|---|---|---|
|  | p5 | median | p95 | p5 | median | p95 | p5 | median | p95 |
| BEL | 1 | 13 | 227 | -11% | 4% | 27% | 4 | 18 | 58 |
| CHE | 6 | 55 | 1191 | -3% | 1% | 20% | 4 | 25 | 107 |
| CHN | 95 | 800 | 7669 | -7% | 20% | 93% | 3 | 8 | 17 |
| CZE | 3 | 15 | 315 | -13% | 7% | 54% | 3 | 10 | 15 |
| DEU | 2 | 19 | 777 | -8% | 1% | 22% | 4 | 25 | 94 |
| ESP | 1 | 7 | 55 | -16% | 2% | 36% | 3 | 11 | 29 |
| EST | 1 | 6 | 64 | -16% | 6% | 60% | 3 | 9 | 15 |
| FIN | 1 | 6 | 111 | -13% | 5% | 43% | 3 | 14 | 43 |
| FRA | 1 | 5 | 84 | -10% | 3% | 24% | 3 | 13 | 43 |
| GBR | 2 | 53 | 969 | -17% | 0% | 35% | 4 | 17 | 70 |
| GRC | 3 | 15 | 124 | -13% | 4% | 35% | 4 | 16 | 44 |
| ITA | 2 | 17 | 203 | -13% | 2% | 27% | 4 | 18 | 47 |
| JPN | 4 | 26 | 403 | -11% | 1% | 21% | 9 | 34 | 61 |
| KOR | 4 | 35 | 394 | -12% | 8% | 60% | 3 | 10 | 34 |
| POL | 9 | 82 | 640 | -10% | 7% | 36% | 5 | 13 | 60 |
| RUS | 12 | 42 | 395 | -12% | 16% | 93% | 3 | 10 | 15 |
| SVK | 6 | 44 | 505 | -12% | 5% | 36% | 6 | 12 | 15 |
| SVN | 2 | 11 | 212 | -9% | 7% | 45% | 4 | 14 | 17 |
| SWE | 1 | 3 | 37 | -15% | 3% | 43% | 3 | 15 | 43 |
| USA | 8 | 40 | 482 | -6% | 5% | 53% | 5 | 51 | 129 |

*Note:* Size refers to average number of employees, growth to the sales growth rate and age to years since date of incorporation.

*Source:* ORBIS firm-level database. Summary statistics of data from 2005 through 2009. Only firms in the final dataset are used (see Table A.3)

## APPENDIX 3: EU-SILC DATABASE. WORKER'S CHARACTERISTICS

**Table A5. Proportion of workers with certain characteristics**

| | Age | | | | Education | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male | 25-35 | 36-49 | 50+ | Less than upper secondary | Upper secondary | Tertiary | Permanent contract | Self-employment |
| AUT | 0.48 | 0.25 | 0.50 | 0.25 | 0.15 | 0.64 | 0.21 | 0.95 | 0.09 |
| BEL | 0.49 | 0.28 | 0.44 | 0.28 | 0.24 | 0.37 | 0.39 | 0.92 | 0.10 |
| CZE | 0.50 | 0.32 | 0.39 | 0.29 | 0.07 | 0.78 | 0.15 | 0.89 | 0.07 |
| DEU | 0.44 | 0.15 | 0.54 | 0.31 | 0.06 | 0.52 | 0.42 | 0.92 | 0.13 |
| DNK | 0.48 | 0.20 | 0.46 | 0.34 | 0.16 | 0.45 | 0.38 | 1.00 | 0.05 |
| ESP | 0.48 | 0.29 | 0.45 | 0.26 | 0.47 | 0.23 | 0.30 | 0.77 | 0.10 |
| EST | 0.48 | 0.24 | 0.47 | 0.29 | 0.11 | 0.61 | 0.28 | 0.99 | 0.05 |
| FIN | 0.50 | 0.21 | 0.43 | 0.36 | 0.15 | 0.45 | 0.40 | 0.89 | 0.11 |
| FRA | 0.48 | 0.26 | 0.45 | 0.28 | 0.24 | 0.46 | 0.30 | 0.87 | 0.07 |
| GBR | 0.48 | 0.26 | 0.46 | 0.28 | 0.15 | 0.52 | 0.34 | 0.97 | 0.05 |
| GRC | 0.49 | 0.31 | 0.44 | 0.25 | 0.36 | 0.39 | 0.25 | 0.78 | 0.14 |
| HUN | 0.48 | 0.33 | 0.40 | 0.26 | 0.16 | 0.63 | 0.21 | 0.91 | 0.08 |
| IRL | 0.48 | 0.21 | 0.45 | 0.34 | 0.38 | 0.31 | 0.31 | 0.94 | 0.06 |
| ITA | 0.49 | 0.27 | 0.47 | 0.26 | 0.42 | 0.44 | 0.14 | 0.88 | 0.11 |
| LUX | 0.49 | 0.36 | 0.42 | 0.22 | 0.37 | 0.33 | 0.31 | 0.91 | 0.06 |
| NLD | 0.49 | 0.22 | 0.48 | 0.30 | 0.21 | 0.43 | 0.36 | 0.89 | 0.05 |
| NOR | 0.50 | 0.25 | 0.47 | 0.28 | 0.16 | 0.45 | 0.39 | 0.94 | 0.04 |
| POL | 0.50 | 0.30 | 0.40 | 0.29 | 0.12 | 0.71 | 0.17 | 0.77 | 0.12 |
| PRT | 0.48 | 0.27 | 0.44 | 0.29 | 0.72 | 0.15 | 0.13 | 0.83 | 0.09 |
| SVK | 0.50 | 0.31 | 0.43 | 0.26 | 0.05 | 0.75 | 0.20 | 0.90 | 0.08 |
| SVN | 0.52 | 0.29 | 0.45 | 0.26 | 0.19 | 0.61 | 0.20 | 0.90 | 0.10 |
| SWE | 0.50 | 0.26 | 0.44 | 0.29 | 0.11 | 0.54 | 0.35 | 0.92 | 0.06 |

*Source:* EU-SILC. Years 2007-10.

## APPENDIX 4: LITERATURE ON HOUSEHOLDS

| Paper | Data | Methodology | Key findings |
|---|---|---|---|
| Anger (2007) | German Socio-Economic Panel Study (SOEP), period 1984-2004 | Panel estimations of the first differences in wages on the unemployment rates and other controls. | Hourly wages do not exhibit cyclicality except for the group of salaried workers with unpaid overtime. Their effective wages react strongly to changes in unemployment in a pro-cyclical way. Despite acyclical wage rates, salaried workers without unpaid hours but with income from extra payments, such as bonuses, experienced pro-cyclical earnings movements. Monthly earnings were also pro-cyclical for hourly paid workers who received overtime payments |
| Backery et al. (2010) | Firm level survey across 14 countries of the European Union (EU) | Multinomial logit model | Collective bargaining coverage is positively related with downward real wage rigidity, measured on the basis of wage indexation. Downward nominal wage rigidity is positively associated with the extent of permanent contracts and this effect is stronger in countries with stricter employment protection regulations. |
| Baeller et al. (2013) | German Federal Employment Agency and Employment Research (IAB) Establishment Panel | Estimation of the elasticity of STW usage to changes in output exploring cross-sectional variation in micro data for recent years. Use this elasticity as a calibration target in a DSGE model and the corresponding stabilization exercise. | Short-time work stabilizes unemployment fluctuations by 15% and output fluctuations by 7%. These numbers are large given that STW expenses are a very small fraction of GDP in most countries. |
| Bartels and Bonke (2013) | GSOEP (Germany) 1984-2009 and BHPS (UK) 1991-2006. | Variance of the permanent and transitory income. Different income concepts: gross earnings to net household income. | They find evidence that the overall inequality of earnings in Germany and the United Kingdom has been rising throughout the period due to both higher permanent earnings inequality and higher earnings volatility. However, taking institutions of the welfare state and risk-sharing households into account, we find that the volatility of net household income has remained fairly stable. Furthermore, redistribution and risk insurance provided by the welfare state is more pronounced in Germany than in the United Kingdom. |
| Bassanini (2011) | EUKLEMS, OECD STAN. 23 countries, 23 industries | - Aggregate cross-country time series analysis on how institutions affect the elasticity of wage fluctuations to the output gap. - Industry-level difference-in-difference analysis. Country and industry specific time trend and country-industry fixed effects. | Generous unemployment benefits and labour taxes amplify the effect of macroeconomic shocks on labour income. However, the tax and transfer system partially offsets the impact of individual earnings volatility on household disposable income. Policies that keep workers in their current jobs, such as short-time work schemes and employment protection for regular workers, are likely to mitigate the average loss of labour income in downturns. |
| Bassanini and Garnero (2013) | Cross-country harmonised data on gross worker flows for 24 OECD countries, 23 business-sector industries and | Difference-in-difference approach – in which the impact of regulations is identified by exploiting likely cross-industry differences in their impact – and standard time-series analysis – in which the effect of regulations is identified through | The more restrictive the regulation, the smaller is the rate of within-industry job-to-job transitions, in particular towards permanent jobs. By contrast, we find no significant effect as regards separations involving an industry change or leading to non-employment. The extent of reinstatement in the case of unfair dismissal appears to be the most important |

| | 13 years | regulatory changes over time. | regulatory determinant of gross worker flows. |
|---|---|---|---|
| Buch (2008) | EUKLEMS 1970-2005 industry-level data for 11 industrialized countries, 22 manufacturing and services industries | Analysis of the conditional and unconditional volatility over five year rolling windows. Fixed effects panel regressions | Capital income volatility is more sensitive to sector-specific developments than labour income volatility. A greater bargaining power of workers lowers the relative volatility of labour income. Differences in trade openness across sectors do not have a significant impact on income volatilities. More developed stock markets, in contrast, tend to increase the relative volatility of labour incomes. |
| Cappelari and Jenkins (2012) | United Kingdom. British Household Panel Survey. Estimations for women as well as men for the period 1992–2008 | Standard deviation of the distribution of the arc percentage changes, for the working age population, excluding students and self-employed. | Earnings volatility in Britain declined slightly for both men and women over the period as a whole, but the changes are not statistically significant. When we widen the scope to look at labour market volatility, we find that there is a marked and statistically significant decline over the period for both women and men, with the fall greater for men. The main factor accounting for the downward trend in labour market volatility is a secular decline in the proportions of workers moving into and out of employment. |
| Celik et al. (2012) | CPS, SIPP, LEHD, and PSID; men aged 25-59 | Standard deviation of arc percentage change. | Volatility of earnings stable in 1990s and 2000s using CPS, SIPP, and LEHD; rose using PSID. In CPS and PSID, volatility rose over full sample from late 1960s/early 1970s. |
| Congressional Budget Office (2008) | CWHS; 1984-2003. Men and women aged 25-55; excl. self-employment earnings | Standard deviation of arc percentage change; fraction of +/- 25 percentage changes in earnings. | Volatility of overall, men's, and women's earnings declined over most of period |
| Dahl et al. (2011) | Unites States administrative earnings records, the Survey of Income and Program Participation (SIPP) matched to administrative earnings records, and SIPP survey data between 1985-2005. | Standard deviation of arc percentage change; fraction of +/- 50 percentage changes in earnings | In all data sources, find a substantial amount of year-to-year volatility in workers' earnings and household incomes. In the data sources that contain administrative earnings, find that volatility has been roughly constant, and has even declined slightly, since the mid-1980s. These findings differ from what is found using survey data and what has been reported in previous studies. |
| Davis and Kahn (2008) | Annual Census Bureau Data. Consumer Expenditure Survey for the United States | Absolute change of log consumption at the household level | Data on labour earnings and consumption do not conform the picture of great stability of the Great Moderation. They conjecture that the greater flexibility in the pay structure is responsible for the increased instability at the individual and household level. |
| Dynan et al. (2012b) | United States PSID; 1971 to 2009; household heads aged 25-59 | Standard deviation of arc percentage change; fraction of +/- 25 percentage changes in earnings | Males' volatility increases in the period 1971-2010, but females decreases |
| Dynarski and Gruber (1997) | United States PSID; 1970 to 1991; male household heads aged 20-59; labor earnings | Variance of transitory earnings defined as gap between actual earnings and individual earnings growth path | Volatility of earnings rose in the late 1970s and early 1980s |

| | | | |
|---|---|---|---|
| Employment Outlook (2012) | - Unbalanced panel of quarterly data for the period 1982 Q1 to 2007 Q4 for 18 OECD countries<br>- Firm-level (ORBIS) data for 19 OECD countries for the period 1993 to 2009 | - At the macro level, to assess the impact of output shocks on the unemployment rate, log total earnings and earnings inequality, a series of dynamic panel data specifications are estimated using quarterly data.<br>- Estimate of the elasticity of labour input with respect to output with dynamic panel equations. Estimate of the impact of policies on the estimated employment and earnings elasticity.<br>- Using micro-simulation methods, estimates of the implications of the way firms adjust in response to shocks for different dimensions of worker welfare (household income, and income inequality). | Policies and institutions that are conducive to good structural labour market outcomes also tend to be good for labour market resilience. On the positive side, co-ordinated collective bargaining arrangements may be an important factor in achieving low structural unemployment rates, while mitigating the direct impact of shocks on employment and facilitating wage and/or working time adjustments. Improving our understanding of the way industrial relations can contribute to good labour market performance is an important avenue for further research. On the negative side, institutional settings that implicitly promote the use of temporary contracts, such as stringent employment protection provisions with respect to regular workers, are associated with weaker structural outcomes, possibly reflecting their impact on frictional unemployment and their negative impact on overall job quality. They also result in less labour market resilience by increasing both the unemployment response to output shocks and reinforcing cyclical increases in overall earnings inequality |
| Giesecke et al. (2011) | German Social Security Administration. West Germany, period 1986 - 2005 | Decomposition of men's earnings into permanent and transitory components. | Increasing overall volatility which is predominantly driven by the permanent earnings component and therefore indicates increasing earnings inequality. |
| Gorbachev (2009) | Estimation of food consumption using the US Panel Studies of Income Dynamics (PSID) | Household level consumption volatility is computed using an incomplete markets consumption model with non-separable preferences for food and other nondurable goods. | Mean volatility of household food consumption increased by 21% between 1970 and 2004, while non-durable consumption volatility went up by 25%. For households headed by non-white and poorly educated individuals, the rise in volatility of consumption was significantly larger than for the average household. Race did not play a significant role in the way income volatility increased. Even though the increase in consumption volatility was significantly smaller than that of family income uncertainty, the cost to society from this rise was significant; an average household would be willing to sacrifice 4.15% of its annual non-durable consumption to reduce consumption risk back to where it was in 1971. |
| Gottschalk and Moffitt (1994) | PSID; 1970 to 1987; white male household heads aged 20-59; wages and salaries | Compute variance of permanent log earnings as the variance of the means across individuals, and the variance of transitory log earnings by computing the variance of the nine transitory components separately for each individual and by then averaging them across individuals | Volatility of earnings rose between the 1970s and 1980s. Shift toward non-unionized jobs increased the overall transitory variance, shift out of manufacturing jobs and into service and trade jobs. Job changes are related to higher earnings instability, but even job stayers suffered an increase in earnings instability, showing this was not the only cause. Finally, the increased instability was widespread across ages and educational groups. |
| Gottschalk and Moffitt (2009) | PSID; 1970 to 2002; male household heads aged 20-59; | Variance of transitory earnings defined using decomposition and estimated using model | Volatility of earnings rose in 1970s, 1980s, 1990s, and early 2000s |

| | wages and salaries | | |
|---|---|---|---|
| Moffitt and Gottschalk (2012) | PSID; 1970-2004. Male heads of households aged 30-59 | Error-components decomposition to obtain transitory variance. | Transitory variance rose in the 70s and 80s and stable since then. Total variance (including permanent component) rose over period. |
| Ostrovsky (2010) | Statistics Canada's Longitudinal Administrative Databank: random 20% sample of all Canadian tax-filers. Period 1985-2005 | Variance of transitory earnings defined using decomposition and estimated using model | Both permanent and transitory variances were higher in the 2000s than they were in the late 1980s or 1990s. |
| Sabelhaus and Song (2010) | United States, one per cent sample of Social Security Administration earnings records for ages 25–55 between 1980 and 2005. | Simple one-year earnings growth rates. Analysis of the variances of changes across multiple frequencies that allows separating transitory from permanent earnings shocks. The empirical strategy for making that distinction involves first measuring the variance of log earnings changes at multiple frequencies and then investigating whether there is a systematic change in the variance as the time-gap over which earnings growth is measured is increased. | Between 1980 and the early 1990s the variability of labour earnings growth rates across the prime-age working population fell significantly. The variability of earnings growth is negatively correlated with age. The decrease in variability was roughly uniform across all age groups. The variance of log changes also declined at multi-year frequencies in such a way that suggests that both permanent and transitory components of earnings shocks became more moderate. |
| Shin and Solon (2007) | United States-NLSY men for the years 1979-80 through 1992-93. | Panel estimations of the first differences in wages on the unemployment rates and other controls. | Job stayers' real average hourly earnings are substantially procyclical and that an important portion of that procyclicality probably is due to compensation beyond base wages. |
| Shin and Solon (2011) | United States PSID; 1971 to 2006; male household heads aged 25-59 | Standard deviation of two-year arc percentage change. | Volatility of earnings rose in 70s, was flat through late 90s, then rose further through 2006. |
| Sologon and O'Donogue (2011) | EHCP 1994-2001. 14 EU countries | Earnings instability measured by the transitory inequality, while earnings volatility by the standard deviation in the year-to-year earnings changes. Non-linear least squares. Systemic interactions of policies and institutions, and institutions and macroeconomic shocks. | Institutions shape the distributional effects of macroeconomics shocks. Stricter EPL, generous UB, high corporatism, deregulated and competitive PMR and high tax wedge tend to lower earnings instability/volatility and counteract adverse macroeconomic shocks. Instead higher degree of unionization has the opposite effect. Unsolved endogeneity problems prevent from interpreting causality. |
| Strain (2013) | Linked employer-employee data: Longitudinal Employer-Household Dynamics (LEHD)-U.S. Census Bureau | Regression controlling for firm-employee characteristics, firm fixed effects. | Positive and statistically significant relationship between firm employment and income volatility that remains when the effect is estimated using only within-firm variation. This suggests that the effect is a feature of the way workers are being paid by their employer. The size of the effect varies by a worker's position in the earnings distribution: low-earning worker are passed a greater share of firm employment instability than higher-earning workers. |
| Tracca (2005) | NBER | Cross section and panel | Empirical estimates seem to support the claim |

| | | | |
|---|---|---|---|
| | productivity database, 4-digit ISIC code for US 1958-1994 | estimates with industry effects. | that wage volatility increases with the degree of openness, as a proxy for trade exposure, and declines with increase in an industry's export intensity, as a proxy for the global market share. |
| Venn (2011) | EU-SILC (short time series), GSOEP (Germany), CNEF (Korea), BHPS (UK), PSID (US) | Volatile earnings measured with arc percentage change of year-to-year changes. Fraction of households with at least 20 % increase or decline in income. | Trends: Increasing in US and Germany, declining in Korea, while in UK stable with large increases at the end of 90's and beginning 2000's.<br>Tax and transfer systems are shown to play an important role in buffering households against the impact of individual earnings volatility. Nevertheless, large changes in individual earnings can still have a significant impact on household welfare in many OECD countries. The incidence of earnings volatility varies considerably across countries, even after controlling for cross-country differences in the characteristics of workers and jobs. This suggests that institutions and policies may play an important role. |
| Winship (2011) | SIPP; 1984-2008. CPS; 1982-2009. PSID; 1969-2006. Adults aged 20-59. Inc. self-employment earnings. Excl. observations with zero or negative income. | Fraction of households with 25 percentage decline in income. | Instability of household income rises using the PSID and the CPS, stable in the SIPP. |
| Ziliak et al. (2010) | CPS; 1972-2008; men and women | Standard deviation of arc percentage change | Volatility of men's earnings rose 1970 to mid-1980s then stable |

## APPENDIX 5: LITERATURE ON FIRMS

| Paper | Data | Methodology | Findings |
|---|---|---|---|
| Acemoglu et al. (2012) | US input-output matrix from BEA (1972-2002). | Intersectorial Input-Output network model. | Rate of decay of aggregate volatility depends on network structure. Influential (input)-industries may invalidate the diversification argument and affect aggregate volatility even in the case of an infinite number of firms. |
| Buch et al. (2009) | Deutsche Bundesbank's corporate balance sheet statistics | Compute conditional firm level volatility based on residual of growth regressions on macro- and firm-specific indicators. | Find that unconditional firm level volatility has declined interrupted by reunification. Conditional firm level volatility, however, exhibits positive time trend. |
| Comin & Mulani (2006) | Compustat firms (1950-2002) | Simple panel regression of 10 year-rolling window standard deviations controlling for firm size, age as well as sector- and firm-fixed effects. | Decline in aggregate volatility with simultaneous increase in average firm level volatility of sales. May be explained by diverging trends embodied innovations (increasing) compared to disembodied innovations (decreasing). |
| Comin & Philippon (2006) | Compustat, CRSP (1955-2000) and KLEM base for industry data (1958-1994) | Several panel regression exercises with 10-year rolling volatility as dependent variable. | The increase in competition and R&D investments led to increases in firm level volatility and, simultaneously, to a decrease of correlation between firms and thus to a reduction in aggregate volatility. |
| Correa & Suarez (2009) | Compustat North-America (1976-1998). Location of firms across US states from the Compact Disclosure database. | Volatility is defined as the absolute value of residuals from a growth regression that controls for size (log(sales)), profitability (EBIT) and collaterals (tangible assets) and a dummy for bank deregulation (out-of-state bank entry permission). Dependent variables are production, sales, cash flow and employment. | Output volatility decreases after bank deregulation. Impact stronger if firm is bank dependent. Short-term credit becomes more counter-cyclical. |
| Davis & Kahn (2008) | US data (Census Bureau, CPS and Consumer expenditure surveys) from end 1970's to early 2000s | Ten-year window standard deviations of sales growth rates. Absolute changes in real consumption as measure of consumption volatility. | Decline in output and employment growth volatilities has not been passed through to consumption and income growth volatility. Better inventory management one of the major drivers for decline in firm-level sales volatility. |
| Davis et al. (2007) | LBD (1976-2001) and Compustat (1950-2004) | Reweighting volatilities by keeping shares across age cohorts, size and industries constant. | Sales growth volatility is low and rising for publically traded firms and high and declining for privately held firms. Shifts in age and size distributions account for most of the convergence dynamics. |
| Fama & French (2004) | CRSP database (1973-2001), IPO database | Asset growth right skewed / profitability left skewed especially for small firms. | Number of new listings per year has increased due to decreasing cost of equity. Smaller firms with uncertain payoffs enter leading to declining survival rates. |
| Gabaix (2011) | 100 largest firms in Compustat (1951-2008). | Define "granular residual" as firm-size weighted average innovations. Regress GDP growth and Solow residuals on granular residuals. | Idiosyncratic shocks to large firms explain 1/3 of aggregate GDP growth innovations. Central limit theorem invalidated due to fat-tailed firm-size distribution. |
| Haltiwanger et al. (2008) | Firm-level data for 16 developed and emerging countries (coverage varies by country, min 1980, max 2002) | Difference-in-difference regressions of job turnover rates on EPL controlling for size and industries. | Stringent employment protection reduces job turnover rate. Adding interactions with PMR does not significantly affect the results. |

| | | | |
|---|---|---|---|
| Higson et al. (2004) | UK firms (1967-1997) from DTI databank, LSPD, EXTAT and Datastream | Percentile growth rates regressed on aggregated GDP. | Rapidly growing and rapidly declining firms are less sensitive to aggregate shocks than average firms leading to cyclical patterns of higher order moments in the distribution of firms' growth rates. |
| Jermann & Quadrini (2006) | GDP components data from BEA and debt repurchases and equity payout from Flow of Funds. | RBC model with productivity, financial frictions and credit shocks. Find a break when calibrating the model. | Financial innovations reduced financial frictions and allowed for a more flexible use of equity financing and debt management. This made the economy more resilient while it increased idiosyncratic volatilities of financial flows. The break is in 1984. |
| McCarthy & Zakrajšek (2007) | Monthly data for manufacturing sectors (1967-2000) from BEA | Block-VAR with industry (sales, inventories, prices) and aggregate (employment, prices) blocks. | Monetary policy shocks transmit more quickly and less persistently to aggregate demand in low volatility periods. Changes in inventory-sales ratios rather driven by sales. |
| Mendoza & Terrones (2008) | 48 countries (26 industrialised + 22 emerging). | Dynamics around peaks of credit. Event study. | Credit booms have different origins in emerging (capital inflows) and industrialised countries (deregulation and TFP gains). Fluctuation are more substantial in emerging countries and credit booms lead more often to financial crises than in industrialised countries |
| Philippon (2003) | NIPA, Compustat (1965-2001) | Theoretic RBC model with price rigidities calibrated with data before and after 1980. | Divergence of idiosyncratic and aggregate volatility may be explained my higher frequency of price adjustments due to increased competition. Firms sales more volatile but economy more resilient to demand shocks. |
| Stiroh (2009) | Value added and hours worked data for 35 US industries. | Decomposes variance of aggregate value added into sector variances and correlations of hours worked and hourly productivity. | The majority of the decline in aggregate output volatility is due to declining covariances between industry output growth. |
| Thesma & Thoenig (2011) | Non-state-owned French firms (1984-2004). Information on ownership concentration and listed/non-listed status. | Panel regressions with industry- and time-fixed effects and controlling for firm sizes are run and residuals retrieved. Absolute value of residuals regressed on ownership variable (concentration or dummy for listed firms) controlling for time- and firm-fixed effects. | Sales and employment volatilities have increased for listed firms but decreases for privately owned (highly owner concentrated) firms. Divergence may stem from different levels of capital market integration and stock market participation. |
| Vannoorenberghe (2012) | French manufacturing firms from the Amadeus dataset of Bureau van Dijk (1998-2007). | | Share of exports positively (negatively) correlated with domestic (foreign) sales volatility. |
| De Veirman & Levin (2011) | Listed US stocks (1986-2005) from Thomson Worldscope database. | Absolute values of sales, EBIT and employment growth innovations are compared to 10 year rolling window volatilities. Time- and firm-fixed effects. | Firm level volatility increased in the 1990's and decreased in the 2000's. Idiosyncratic volatility seems to rise during boom periods and fall in the aftermath of recessions. |

# APPENDIX 6: DATASETS

**Databases**

**Households/Individuals**

| | Variables | Countries | Period | Type | Frequency |
|---|---|---|---|---|---|
| Household Expenditure Survey (HES) | Provides consumption /expenditure data | EU countries | 2006-10 | Panel (2y) | Annual / 5 years |
| Household Expenditure Continued Survey (HECS) | | | 1997-2005 | | Quarterly for some |
| ECHP | Income and living conditions. Household and individual level. | EU countries | 1994-2001 | Panel | Annual |
| EU-LFS | Household micro data about labour force and employment | EU countries | 1983-2011 | Cross section mainly | Quarterly |
| EU-SILC | Household micro data on income, poverty, social exclusion and living conditions. | EU countries | 2004-11 | Rolling panel of maximum 4 waves and cross section | Annual |
| Survey on Household Income and Wealth (SHIW) | Household micro data | Italy | 1989-2010 | Panel (small fraction of households) | Every two years |
| Panel Study of Income Dynamics (PSID) | Household micro data | USA | 1968-2009 | Panel | Annual (from 2001 every two years) |
| German Socio-Economic Panel (GSOEP) | Household micro data | Germany | 1984-2011 | Panel | Annual |
| British Household Panel Survey (BHPS) | Household micro data | UK | 1991-2011 | Panel | Annual |
| Household, Income and Labour Dynamics in Australia (HILDA) | Household micro data | Australia | 2001-11 | Panel | Annual |
| Swiss Household Panel (SHP) | Household micro data | Switzerland | 2002-09 | Panel | Annual |
| Korea Labor and Income Panel Study (KLIPS) | Household micro data | Korea | 2001-10 | Panel | Annual |
| Japan Household Panel Survey (JHPS) | Household micro data | Japan | 2009-10 | Panel | Annual |
| Survey of Labour and Income Dynamics (SLID) | Household micro data | Canada | 1996-2009 | Panel | Annual |

**Firms**

| | | | | | |
|---|---|---|---|---|---|
| ORBIS – firm-level database | Administrative data | OECD + G20 countries | 1999-2009 | Panel | Annual |
| Amadeus | Administrative data | 43 European countries | 1993-2010 | Panel | Annual |

**Firms and employees**

| | | | | | |
|---|---|---|---|---|---|
| **SES (Employer-employee type data)** | Establishment survey. Earnings, individual characteristics of employees and their employer. | EU countries | 1995, 2002, 2006, 2010 | Panel | |

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