EUROPEAN
POLICYBRIEF

Rebalancing labour power for an Innovation-fuelled Sustainable Inclusive Growth

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ISIGrowth is a 3-year EC Horizon 2020 funded project aimed at offering comprehensive diagnostics on the relationship between innovation, employment dynamics and growth in an increasingly globalised and financialised world economy. The project will provide a coherent policy toolkit to achieve the Europe 2020 objectives of smart, sustainable and inclusive growth. The theoretical foundation is based on the dynamic link between Schumpeterian economics of innovation and Keynesian demand policies. Analytical tools include agent-based modelling, non-parametric statistics, and detailed case studies of business and industry histories.

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SUMMARY

This Policy Brief summarizes the main findings of the ISIGROWTH project related to the institutional organization of labour markets and its consequences. Together, it analyses the general failure of supply-side policies aimed at reducing the labour costs and undertaking fiscal consolidations in recessionary/low-growth periods.

In doing so, it presents the results of the project concerning the link between the institutional set-ups of the labour market and inequality, the occupational impact of technological change, and the deteriorating link between productivity growth and wage growth in the European economies. The analysis is followed by a set of policy proposals.

INTRODUCTION

Do more flexible labour markets foster innovation and growth? A positive answer has indeed been the mantra since the OECD (1994) Jobs Study. Historically, measures of flexibilization have often been accompanied by two other policy strategies, namely austerity policies, largely pursued to counteract the sovereign debt crisis, and active labour market polices meant to lubricate supposedly sclerotic labour markets. What results did these strategies produce?

The present Policy Brief highlights the main findings of the ISIGrowth project focusing on the relationship between the organization of labour markets, technological change and income distribution. In particular, we address the effects that institutional set-ups and technology exert on wage remunerations, and on the pass-through intensity from productivity to wages. The latter are particular important in order to understand the extent to which gains from technological change are shared or appropriated by the firms.

Coherently with consortium skills and expertise, the topic has been studied by means of micro, meso and macro lens. Therefore, the following Policy Brief starts with the main findings on the grounds of theoretical macroeconomic models, and moves to empirical studies performed both at sectoral and firm levels. Finally, we list a series of policy schemes resulting from our findings aimed at tackling unemployment and inequality.

LABOUR MARKETS AND INDUSTRIAL RELATION REGIMES: A COMPLEXITY APPROACH

From a theoretical perspective, a series of papers have investigated the properties of the "labour-augmented Schumpeter meeting Keynes" agent-based model, studying the transformations entailed by the changing organizational structure of labour markets, moving from "Fordist" to "Competitive" regimes characterized by different degrees of flexibility and alternative firing schemes.

The Agent Based methodology

As well known, a familiar approach to macroeconomic phenomena involves the compression of the dynamics of a complex evolving system into the behaviour of a rational forward-looking representative agent, possibly perturbed by some frictions, adjustment lags or informational imperfections. However, such an assumption, that the working of modern economies is basically equivalent to the behaviour of a central planner, rules out by construction all macro questions which entail interdependencies and coordination (and possibly coordination failures). The ABMs approach is at the opposite methodological end and explicitly acknowledges the thread of interdependencies among multitudes of functionally differentiated agents.

More in details, Agent-Based Models are large-scale, computational models which allow the simulation of artificial economies wherein ensembles of heterogeneous agents interact on the ground of simple behavioural rules. Aggregate-level outcomes are the emergent properties from the interactions of such boundedly rational agents. Unlikely DSGE models driven by the search of closed-form solutions derived from linearisation around equilibrium conditions, ABMs are open-ended systems where the notion of *coordination* substitutes the one of equilibrium. Moreover such models may display path-dependency along *each* simulation history, as well as *between* alternative simulations. Short of any derivation from some principle of rationality, ABMs ought to be primarily judged on their ability to reproduce as *emergent properties* sets of *stylised facts*, i.e. empirically observed statistical regularities. The use of agent-based models has become the standard practice in many disciplines dealing with complex phenomena, wherein the micro and the macro levels are not isomorphic. More recently, these models have also been adopted in economics. Indeed, the features of ABMs are particularly suited to the analysis of economic phenomena characterised by (i) disequilibrium processes and (ii) persistent heterogeneity.

The main features of the two regimes are telegraphically sketched in Table 1. Under the *Fordist regime*, wages are insensitive to the labour market conditions and indexed on a combination between economy-wide and firm-level productivity growth. The same wage is simultaneously paid to all incumbent workers of a firm, so that there are no intra-firm wage differentials. There is a sort of covenant between firms and workers concerning "long term" employment: firms fire only when their profits get negative, while workers are loyal to their employers and do not seek alternative occupations. Labour market institutions include a minimum wage fully indexed to aggregated economy productivity and unemployment benefits financed by taxes on

profits. The main features of the Fordist regime are (i) the low probability of a worker being unemployed, (ii) a wage dynamics mostly insensitive to the business cycle, (iii) a wage growth indexed upon productivity growth, (iv) a low degree of inequality, and (v) significant, tax-based unemployment benefits.

Conversely, in the *Competitive regime*, flexible wages respond to unemployment and market conditions, and are set by means of an individual bargaining process where firms have the last say. Employed workers search for better paid jobs with some positive probability. The Competitive regime is also characterized by different labour institutions: minimum wage is only partially indexed to productivity and unemployment benefits – and associated taxes on profits – might or might not be there. Workers have a (institutionally determined) reservation wage equal to the unemployment benefit they would receive in case of unemployment, if any. The aspiration wage of each worker is a function of the individual unemployment conditions and the past remuneration history. If the worker was unemployed in the previous period, her aspiration shrinks: she will request the maximum between the unemployment benefits (if available) and her own satisfying wage, accounting for the recent worker-wage history. Firing occurs whenever a firm *desires* a shrinkage of its production.

	FORDIST	COMPETITIVE
Wage sensitivity to unemployment	rigid	flexible
Search intensity	unemployed only	unemployed and employed
Firing rule	under losses only	shrinkage on production only temporary contracts increasing protection contracts
Unemployment benefits / tax on profits	yes	no or reduced
Minimum wage productivity indexation	full	partial

Table 1: The two archetypal labour regimes main characteristics configured in the model.

In a first paper, Dosi et al. (2017b) have undertook a set of exercises of *comparative institutional dynamics*, evaluating the long-term performance of economies characterised by different degrees of labour market liberalization. In a second paper, Dosi et al. (2017a) have studied the effect of institutional shocks – the structural reforms – *within* each simulation run. In both sets of exercises, the term of comparison is the performance of the economy measured by a set of statistics, e.g. rate of growth and volatility of GDP, likelihood of crises, unemployment, inequality measures. A third paper (Dosi et al., 2018a) has addressed the presence of hysteresis, the ensuing dynamics of workers' skills and of long-term unemployment emerging in the two alternative regimes.

Overall, the findings of this series of papers may be summarised by the flow diagram presented in Figure 1. The chain of feedback mechanisms yields in the Competitive regime higher functional inequality, higher wage dispersion, higher income concentration and hysteresis. The lower aggregate demand and the higher unemployment feed back upon both wage and numerical flexibilities which in turn amplify the former. The model, deeply Keynesian in spirit, entails a wage-led dynamics wherein inequality is detrimental for macro dynamics: lower effective demand slows

down investment notwithstanding firms' relatively high (retained) profits. Let us consider the mechanisms at work in some detail.

From wage flexibility to unequal income distribution

◇ A first one relates to the lower share of wages in the Competitive set-ups and a correspondingly higher share of profits. The change in the functional income distribution impacts macroeconomic dynamics via different propensities to consume between workers and capitalists: in fact, even though wages are fully spent in both regimes, the lower wage share leads to a lower aggregate consumption. In turn, the latter induces lower investments via an accelerator-type mechanism. The ensuing lower aggregate demand is reflected by higher unemployment. The larger fraction of unemployed workers induces a surge in inequality as shown by the increase in the Gini coefficient. Additionally, the longer the unemployment spell, the lower the requested wages by workers.

From numerical flexibility to unequal personal income distribution

◇ The second mechanism concerns the firing process: if firing is easier and unemployment spells are longer, newly hired workers tend to have much lower wages, inducing between-workers inequality. On top of that, when firing is linked to the firms shrinkage of production, as firms are heterogeneous in their market performances, also between-firms wage inequality increases.

From numerical flexibility to skills deterioration and hysteresis

◇ The third channel goes from numerical flexibility toward skills deterioration: the easiness of firing determines a sharp drop in workers job tenure and, indirectly, has a negative effect on skills accumulation and, consequently, on productivity. Not only the firing rule, but also the "firing order" affect the dynamics of productivity growth. In the Fordist regime, firms first hire (fire) workers with higher (lower) skills. Conversely, in the Competitive case, firms use the skills-to-wage ratio as a decision guide to preferentially hire (fire) workers with superior (inferior) short-term "returns". Such a behaviour has a negative impact on the aggregate skills level of the incumbent workers over time.

From declining aggregate demand to Keynesian unemployment

◇ Finally, the fourth channel goes from higher unemployment induced by inequality and hysteresis, to both wage and numerical flexibilities: higher unemployment (i) reduces workers bargaining power in the wage determination process, yielding lower wage growth and (ii) shrinks the overall market opportunities for the firms, thus increasing the firing rates. The whole process exacerbates inequalities and propagates in vicious cycles.

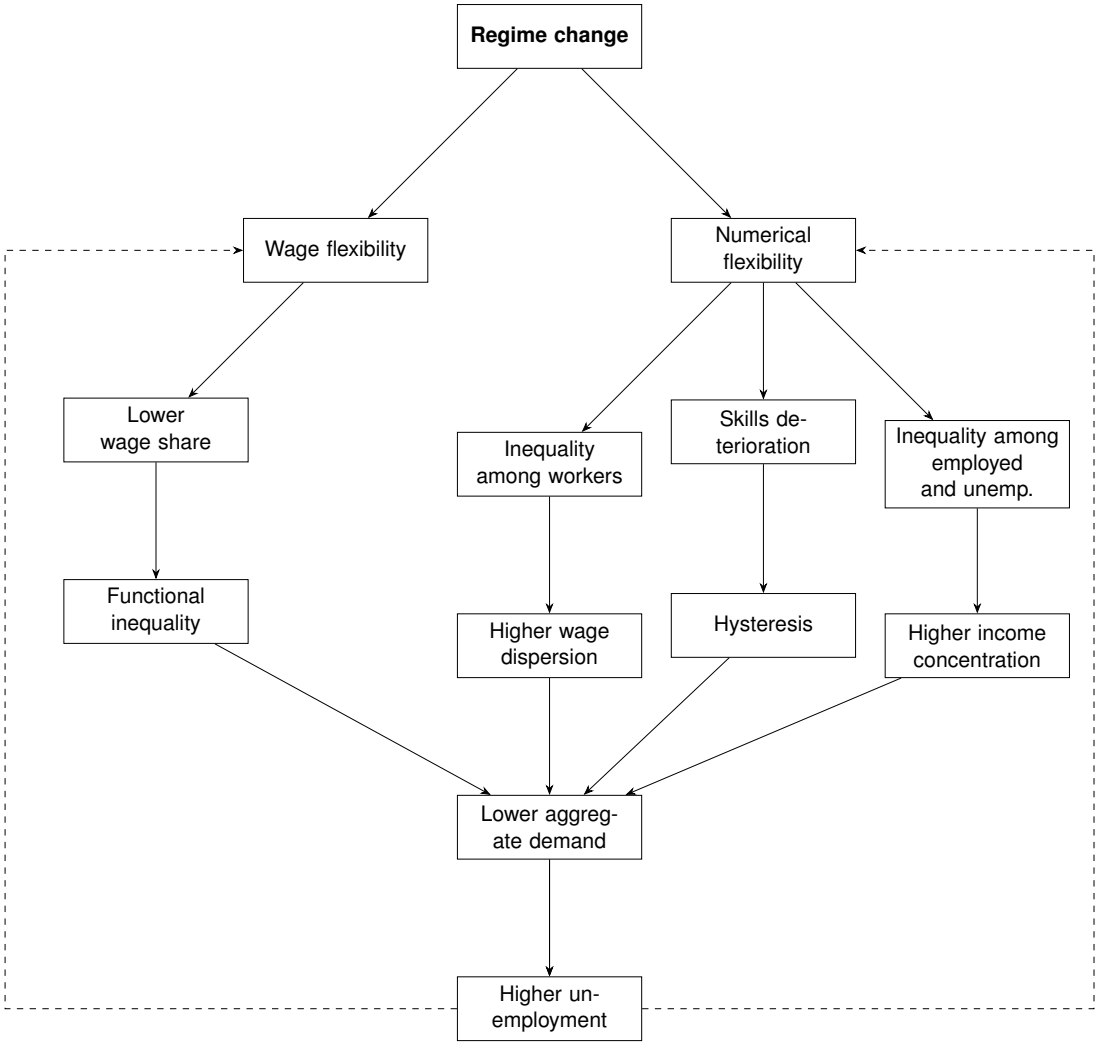


Figure 1: The feedback mechanisms induced by the regime change.

	UNEMP. BENEFITS	QUALIF. TRAINING	FISCAL POLICY
Fordist	✔	✖	Automatic stabilizer
Competitive AS	✔	✔	Automatic stabilizer
Competitive FC	✔	✔	Fiscal Compact

Table 2: The tested fiscal rule configuration scenarios.

Debunking the orthodox policy mix

Finally, in a last paper Dosi et al. (2018b) have studied the effects of Active Labour Market Policies aimed at promoting job search and matching, and at providing training to unemployed people. Next, they have compared the effects of these policies with unemployment benefits simply meant to sustain income and therefore aggregate demand. The analysis accounted also for the burden of unemployment benefits in terms of public budget, and the constraints on the latter stemming from fiscal regulations similar to the European Stability and Growth Pact. Results show that (i) an appropriate level of skills is not enough to sustain growth when workers face adverse labour demand; (ii) supply-side policies are not able to reverse the perverse interaction between flexibility and austerity; (iii) PLMPs (passive) outperform ALMPs (active) in reducing unemployment and workers' skills deterioration; and (iv) demand-management policies are better suited to mitigate inequality and to improve and sustain long-run growth.

They have further tested how the implementation of the full package of orthodox policies – including flexibility of the labour market, active labour market policies and austerity – might affect the system. In particular, the paper compared the best-performing variant of the Competitive regime under two alternative fiscal policies. The first entails an automatic stabilizer rule (AS) wherein there is no hard limit to public expenditure, while the second applies the Fiscal Compact rule (FC) that enforces strict prescriptions for the public deficit and debt (see Table 2). Of course, the claimed objectives of the policy schemes are (i) a higher GDP growth, (ii) the stabilization of public finance, and (iii) smoother labour market adjustments. A Fordist scenario is included for reference. Do they succeed?

In order to study the degree of resilence and the ensuing hysteresis of the three configurations, Figure 2 presents some graphical representative samples of the GDP long-term trend recovery after a crisis occurs. The grey area marks the recovery periods entailed by a GDP shrinkage of at least 3% while the dotted lines plot the pre-crisis growth trend. The plots are selected from the 50 Monte Carlo runs used for statistics gathering in each of the tested configurations. The difference in terms of hysteresis among the three set ups is rather pronounced. The Fordist regime presents frequent but mild fluctuations whose recovery periods are usually short, as measured by the length of the grey areas. In comparison, the Competitive AS sample exhibits deeper crises and longer recoveries. Note, however, that in this case the dashed lines have similar slopes, indicating that the "growth potential" is being (more or less) preserved during the crises. This situation changes in the FC sample, with even stronger and more lasting crises, wherein more frequently the dashed line slope changes, indicating the highest level of hysteresis, or actually super-hysteresis, with lower GDP growth rates, affected by long-lasting recessions.

Corroborating results have been obtained in other ISIGrowth papers. In particular Ciarli et al. (2017) present an agent based model which addresses the relation between income growth and distribution, mediated by structural changes. Here the distinct growth regimes are defined by different parametrizations of income shares of managers, profits, and by different elasticities of wages to productivity and inflation.

On the link between demand generation and income distribution, Dosi et al. (2017a) and Ciarli et al. (2017) highlight the importance of the relation between aggregate demand, different propensities to consume between workers and capitalists/managers and inequality. Although different in terms of the mechanisms triggering inequalities, both contributions point at the detrimental effect of wage compression on functional and personal income distributions, due to the different structures of consumption between capitalists (and/or managers) and workers.

On the link between innovation and demand generation, the models allow to study not only equity but also efficiency outcomes of the two alternative industrial relation/growth regimes in terms of GDP and productivity growth.

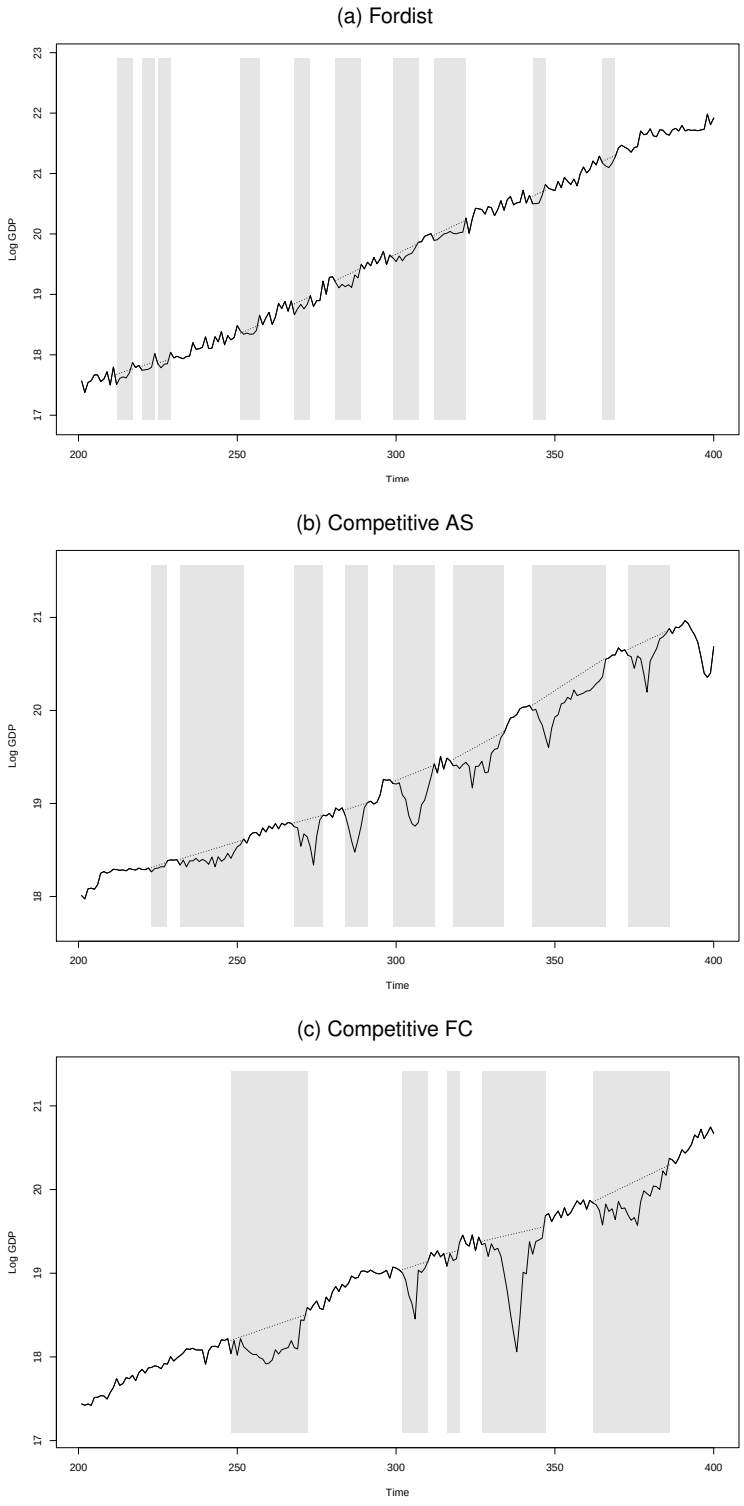
MAIN FINDINGS

Debunking the purported benefits of flexibility of the labour-market

◇ More rigid industrial relations and a full distribution of the gains of productivity to wages are two essential conditions to foster productivity and GDP growth.

◇ It emerges that there is *no equity/efficiency trade-off*.

Figure 2: GDP long-term trend recovery after crises. Selected runs in period $[200, 400]$. Dashed line: pre-crisis trend | grey boxes: trend recovery period. Source Dosi et al. (2018b).



Labour market institutions and inequality

The empirical counterpart of the ensuing effects of the changing institutional structures of labour markets has been studied in Cirillo et al. (2018). The authors consider two major trends that have characterised the evolution of European labour markets. First, as part of the broader process of labour market deregulation and increased flexibility that took place starting from the late 1990s, there has been a shift away from the “corporatist" system of industrial relations that had characterized most European countries in the second half of the 20th century. Beginning with a regime centred around “multi-employer" collective bargaining conducted at centralised (national or sectoral) level, the tendency has been toward “single-employer" collective agreements bargained locally at the firm level. The second trend has been the progressive widening of wage inequalities within firms, indeed an important component of overall wage inequality in most economies.

While a large literature studies the effects of decentralization on inter-firm wage differences, that is comparing the dispersion of wages among workers that are covered by a firm-level agreement against the dispersion among workers who are not, the paper addresses the question whether firms that adopt *also* firm-level bargaining exhibit a more unequal wage distribution than firms that *only* adopt centralised bargaining.

By examining sample of six selected European countries (Belgium, Spain, France, Germany, the Czech Republic and the United Kingdom), in the years 2006 and 2010, the work documents that:

MAIN FINDINGS

Firm-level bargaining has widely heterogeneous effects

◇ First, results are specific to national frameworks, underscoring the need to estimate country-specific models.

◇ Second, circumstantial evidence suggests that firm-level bargaining might have opposite effects, even within the same country. When local bargaining increases inequality between high-paid and low-paid workers (as in Spain and France in 2010), this happens through higher wages paid to high earning workers and lower wages paid to low earning ones. But there are also cases in which firms that *also* bargain locally tend to pay managers less and manual workers more, compared to firms that only bargain at the sectoral or national level.

Wages and productivity

With reference to the UK, Ciarli et al. (2018) address the question of whether productivity gains are shared with workers and what are the sources of heterogeneity that characterise such link. By using matched employer-employee data from the UK Annual Survey of Household Earning and the Annual Business Survey, looking at the post-crisis period (2009-10) and the following (sluggish) recovery period (2011-15), and at different age cohorts (16-24), (25-34), (35-65), across occupational categories and wage quantiles; and finally distinguishing between unionised and non-unionised workers, the paper reports:

MAIN FINDINGS

Low elasticities of wages to productivity

◇ The pass-trough is lower in the service rather than in the manufacturing sector.

Important role of unionisation

◇ Unions are able to mitigate the effects of the fall of wage elasticities to productivity gains.

Technology, labour demand and inequality

Among the societal consequences of innovation, its potential impact on labour demand has been explored at least since Ricardo's time. The complex nexus linking technology and occupational dynamics has been the focus of a reach and detailed survey study (Calvino and Virgillito, 2018), analysing the micro and sectoral level impacts of technological change on employment. After listing the series of *compensation mechanisms* balancing, or not, the potential labour-shedding/labour-creating effects of technology, the authors conclude that the positive effects of technological change on employment are stronger at the firm-level, and particularly for high-growth, high-technology firms, especially in more innovative economies. Nonetheless, in order to evaluate the overall net effect, studies should focus on the sectoral impact of technological change: a positive role of process innovation at the firm level might often hinder job displacement at industry level, to different degrees, when such effects are not estimated.

Although a large stream of literature has analysed the wage-technology link at individual workers level, firm level analyses have been often neglected. Cirillo et al. (2017) explore whether innovation has effects on within-firm wage inequalities, by exploiting a representative sample matching employer and employee data for four major European economies (Germany, France, Spain and Italy).

First, the contribution sheds further light on whether innovative and non-innovative firms display differences in within-firm wage dispersion. Two measures of within-firm wage inequality are considered, namely the wage gap between high-paid vs. low-paid employees (90th-to-10th percentile wage-gap), and the wage-gap between managers and low-layers workers. Indeed, distinguishing by occupational status may be relevant, as it can be connected to the presence of different incentive schemes and different power structures within the firms.

Second, they investigate the combined role of firm size and innovation in shaping the wage-gaps arising within firms. Size certainly has strong linkages with the modes, sources and outcomes of innovation and is also acknowledged to be of crucial importance to the distribution of wages within firms. In fact, larger firms usually display more formalised organisational structure and wage-setting schemes, in turn pushing up within-firm wage dispersion. However, larger firms may also feature a more compressed wage structure due to the action of a number of institutional factors – e.g., a higher incidence of unions and/or specific legal provisions on collective wage bargaining.

MAIN FINDINGS

Size and sectors matter

◇ Firm size plays an important mediating role and so do sectors. In fact, larger innovative firms turn out to be more egalitarian than their small counterparts, irrespective of the measure of within-firm inequality.

Institutions matter

◇ While the relationship between innovation and wage inequality appear to be largely firm-specific, the ways different firms manage their labour relations and income distribution are shaped by broad institutional factors such as unions, regulations on collective bargaining and, more generally, employment protection rules.

POLICY AGENDA

Austerity policies have failed

◇ Fiscal consolidation has shown to be self-defeating when conducted in recessionary periods. Fiscal policies have to be **counter-cyclical**. Europe urgently needs to abandon deflationary policies, based on wage compression and reduction of unit labour costs.

Structural reforms policies have failed

◇ The gradual abolition of labour market institutions has worsened working conditions, prospects of wage increases, deteriorated careers opportunity and made the macroeconomic system less resilient to crises.

Europe urgently needs redistributive polices

◇ The balance of power between wages, on the one hand, and rents and capital gains on the other, should be reversed.

◇ Unions have to be strengthened in order to ameliorate both functional and personal income distribution.

◇ Employees should not suffer the employer risk.

◇ The gains from productivity have to be redistributed reducing the wage-productivity gap.

Harmonization of labour policies

◇ A European unemployment subsidy: by both allowing equal treatment for unemployed people and avoiding labour-cost competition, it will promote European cohesion and fiscal and political integration.

◇ Policy schemes supporting long-term unemployed people should be designed, with active role of the member states in providing novel jobs opportunities for them.

POLICY AGENDA

Training policies should be rethought

◇ Firms should not expect to hire ad-hoc trained employees, but rather they have to invest in enhancing employees' learning, mainly via on-the-job training schemes. In order to cope with rapid technological advancement workers should first of all possess a wide range of skills. Higher level reasoning and abstract skills have to be taught and developed.

The direction of technological change has to be shaped

◇ Europe needs to shape the direction of technological change, promoting the development of **human-enhancing innovations** and fostering innovation in low-productive sectors. Technology should be used to **substitute** more risky and arduous works. Mission-oriented projects should actively involve workers and technicians, and should ultimately lead to an egalitarian distribution of the returns of technological progress.

Enhancing tax progressivity

◇ All the above policies need to be financed. Without a strong progressive taxation scheme, the possibility to revert the current trend of "wage-less" production might hardly be reverted. Wealth and capital gains should be taxed at much higher rate than incomes.

A web tax

◇ A web tax at the European level has to be introduced. The latter should not be based on the value added recorded in transactions, but rather on the overall turnover of internet giants, and the number of registered users and accounts.

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PROJECT IDENTITY

PROJECT NAME	Innovation-fuelled, Sustainable, Inclusive Growth (ISIGrowth)
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