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From minimising harm to maximising potential: why overcoming future crises requires redoubling our investment in human development

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ABSTRACT

Modern-day crises are taking on a new character: they are becoming more unpredictable, severe, frequent, and transboundary. Since traditional crisis mitigation efforts like social solidarity and countercyclical stabilisation policies were designed for crises with a certain degree of predictability, they are likely inadequate for dealing with the complex shocks we expect to face in the future. In addition to these existing systems, we need new crisis mitigation approaches. We argue that overcoming modern crises requires both small and large-scale innovations, across all levels of society - from incremental innovations that occur at the individual and family levels, to large-scale innovations that occur at the levels of the firm, community, and even the nation. However, to maximise the chances of successful innovation at the scale needed to address future crises, all people need to be operating at their full developmental potential. Achieving this requires massively increasing our spending efforts in human development, particularly for vulnerable populations. This is not an argument for supporting vulnerable people at the lowest possible cost, so that if a

crisis strikes, we will minimise the harm that comes to these people. This is an argument for an enormous scale up of social spending and international aid to maximise people's development potential, because we believe that this is an essential and non-negotiable condition for enhancing our collective capacity to overcome future crises.

Keywords: Human development, crisis management, global crises, innovation, social investment, NSI

JEL codes: F35, H53, I00, O31, O35

Introduction

The World Bank (2023, p. 3) has labelled the confluence of pandemics, violent conflict, and climate change as “unprecedented”. As the climate has warmed, rising sea levels, extreme weather events, and shifting climate zones are becoming ever more frequent and severe (OECD, 2022). In addition to their immediate impact, these events have profound socio-economic consequences, through damaging infrastructure, increasing the incidence of water-related diseases, and contributing to poor harvests and food scarcity (OECD, 2022). At the same time, there has been a rise in armed conflicts over the past decade, which have led to the loss of life, disrupted value chains and destroyed infrastructure, and contributed to large-scale population displacement (UNDP, 2022). Pandemics like COVID-19 have compounded the long-building impacts of other shocks, where poor and vulnerable communities, who already bear the brunt of violent conflict and natural disasters, have been hit hardest (World Bank, 2021a). The COVID-19 pandemic also caused

widespread job losses and a sharp decline in global economic growth, with the World Bank (2021b) estimating that it pushed around 120 million people into extreme poverty. The interaction between these crises is unprecedented and creates a complex web of challenges that exhibit increasingly transboundary dynamics and extend over prolonged periods of time (Dahlke et al., 2021). These crises, alone and through their interactions, impact multiple systems, sectors, and societal functions simultaneously; exacerbating their impact on both the economy and human wellbeing.

High income countries can seek to insulate themselves from our increasingly turbulent times. We see moves to tighten boarder control, increase military expenditure, and favour inward looking economic policy, including trade barriers and reduced foreign aid. This may lead to an increased sense of security in the short term, but it reduces our collective chances of navigating our turbulent future successfully. We outline how, to maximise our chances of successful navigation, we have to recognise that solutions to our shared challenges could come from anywhere, and what is critical is that we maximise everyone's capacity to find those solutions. By doing so, we maximise our collective capacity. We do not seek to enter the debate on whether isolationist or collaborative approaches are best suited to dealing with today's challenges. Rather, we focus on how collaboration today will affect our ability to deal with future challenges. If, as we expect, these challenges will be far greater than today's, a failure to prepare for them could be catastrophic.

We assert that our ability to navigate crises is a function of our collective innovative capacity. The degree to which innovations can occur depends on the network of

institutions, structures, and policies within a country that shape and support the innovation process (Filippetti & Archibugi, 2011; Lundvall, 2007; Scerri, 2020). Institutional frameworks are, however, only one part of the story. Our innovative capacity is also a function of how prepared are those seeking to innovate. How prepared people are to innovate is a function of their human development. Therefore, to maximise innovative capacity, and improve our ability to navigate crisis, we must invest in human development. As human development is highly sensitive to childhood context and experiences, this means investments aimed at improving children's environments now, so that innovative capacity is maximised in the future. Given the levels of inequality between and within countries, significant numbers of children currently do not have the opportunities needed to reach their potential. This loss of potential diminishes their, and as a consequence, our, collective capacity to innovate. Moreover, we argue that investments in human development exhibit diminishing marginal returns. Therefore, as the frequency and or severity of crises increases, the cost of this lost potential and associated capacity to innovate will also increase.

The innovative capacity of more vulnerable populations is rarely discussed beyond a consideration of how they could be better supported to help themselves. That such populations could contribute to addressing the challenges crises will pose for everyone calls for a major shift in how their role in society is conceptualised, and the nature and level of support they receive. This shift should not diminish the importance of investing in people so that they are better able to support themselves and those around them, in calm times or in times of crisis. Rather, it adds to this argument, by noting that while for the vast majority, those spheres of influence are

typically very small. For some, they stretch to the wider community. For others, the country. And for some, possibly the world. At times this may happen at the individual level, the next Einstein could be born anywhere and be at risk of malnutrition or premature death. It is more likely, however, that this occurs at the group level. As communities and countries are better equipped to innovate, so the chances that they will innovate in ways which benefit others (near and/or far) will increase.

The Covid-19 pandemic highlighted the importance of innovation at all levels. We saw households implementing creative remote work setups and homeschooling solutions, firms developing essential medical products like ventilators and PPE, communities organising mutual aid networks to support vulnerable members, and national efforts focused on developing and distributing new vaccines (Dahlke et al., 2021). The role of innovation in response to new types of crisis suggests that we need to rethink the sufficiency of the two main shock absorbers in response to crises, social solidarity measures and countercyclical macroeconomic stabilisation policies. In the context of increasingly unpredictable, severe, and frequent 'polycrises', the tried and tested approaches may no longer be sufficient.

Our logic leads to an argument for a radical increase in the level of investment in human development worldwide, especially for children living in adversity. It does not necessarily call for different types of investments so much as a completely different level. We could be criticised for instrumentalising children in adversity by suggesting we should invest in them because of what they can do for us. Moreover, that we are shifting the responsibility to respond to crises away from the state and onto individuals. But the alternative is the rights-based approach which seeks only to

minimise harm rather than maximise potential. It casts people as passive beneficiaries, while we see active contributors to society. We would go as far as to argue that for many, serving as an instrument to help others and contribute to the greater good is a fundamental human need; one which rights-based activists realise for themselves, but do not see in others. We also reject the idea that maximising human potential as a form of crisis response shifts the burden from the state onto individuals. On the contrary, we argue that this endeavour requires extensive public investment in human development on an unprecedented scale, reinforcing, rather than diminishing the state's role in crisis response.

We acknowledge that our proposals are unlikely to persuade governments worldwide to overhaul their approaches to investing in human development. However, we take inspiration from thinkers like Thomas Piketty and Rick Turner, who argue that bold, ambitious ideas are necessary to address systemic issues, even if they seem politically or logistically challenging. Piketty has been criticised for his proposals, such as a global wealth tax, which many view as unrealistic. Yet, he argues that major reforms once deemed impossible have occurred anyway, and that the scale of modern problems demands equally bold solutions (Piketty, 2020). Rick Turner advocated for participatory democracy and control over the means of production for black labourers during apartheid South Africa, under the belief that deep-rooted inequalities are resolved through bold structural reforms rather than incremental changes (Turner, 1975). Like these thinkers, we believe that meaningful change is possible, but only if we dare to think beyond the constraints of the present. Rather than limiting our thinking to what is politically feasible today, we propose these ideas to push the conversation forward and challenge conventional wisdom.

Why invest in human development in preparation for crises? Section 1 revisits the fundamental contribution of traditional shock absorbers constituted by social protection systems and countercyclical stabilisation policies. Section 2 shows that contemporary economic, geopolitical, and environmental changes lead to increasing and multifaceted uncertainty, requiring enhanced innovation capacity and cooperation. Section 3 acknowledges that the ability of economies to cope with multifaceted crises depends partly on the existence and quality of their innovation systems in the broad sense. Section 4 proposes a simple model to illustrate this intuition, several hypotheses of which are discussed in greater detail in Section 5. Section 6 proposes a framework for analysing human development that integrates innovation, and Section 7 emphasises that it is less about minimising harm than it is about maximising the innovation potential of the greatest number. The final section concludes.

1. Traditional shock absorbers

In the face of crises and unforeseen shocks, modern economies have developed two main types of complementary social shock absorbers: 1/ social welfare, based on a principle of mandatory national solidarity, and 2/ countercyclical macroeconomic stabilisation policies.

1.1. Social solidarity measures

The rise of modern market-based and industrial economies in the early 19th century brought with it periodic increases in unemployment and poverty, largely due to the emergence of business cycles. Individuals first relied on old forms of solidarity, such

as family, parishes, and guilds, to protect themselves from adversity during economic downturns (Broadberry & Lennard, 2024; Ravallion, 2020). They then created mutual aid societies to improve and extend these networks of support. However, these arrangements were based on voluntary contributions, and were mostly deployed within relatively homogeneous and restricted social groups, which limited their ability to cushion shocks and deal with unforeseen events (Castel, 2003).

At the end of the 19th century, something completely new emerged. Social insurance, first introduced in Germany shortly after its political unification, allowed for an unprecedented level of solidarity by mandating contributions in exchange for unemployment benefits, healthcare, and pensions. These rights benefited even larger groups of people than before, united by industrial sectors, professions, and/or regions within the same country (Kuhnle & Sander, 2021). Whether based on social contributions or taxes, social protection rights progressed considerably after the Second World War in advanced economies, all of which developed a more or less universal and protective welfare state (Nullmeier & Kaufmann, 2021). For the first time in history, social solidarity was institutionalised on a national scale, surpassing traditional forms of mutual aid based on family, tribe, parish, or guild. By socialising risks and costs across entire nations, these systems maximised the pool of contributors, thus reducing individual costs while increasing the overall benefits of social insurance (Esping-Andersen, 1990).¹

¹ In practice, some individuals and subgroups have a larger gap than others, to the extent that some groups are net contributors (employed/active people, in good health, of working age), while others are net debtors (unemployed, people in poor health, very young or old people). Net debtors will never be able to repay net creditors, which is justified both by the principle of national solidarity and by the principle of a veil of ignorance. Thanks to the maximum size reached by the pool of contributors, the individual unit cost of social protection is minimised due to economies of scale in managing the redistribution system and the healthcare system (in the case of countries with a relatively centralised national healthcare system). The most advanced social protection systems began to be eroded from the end of the 20th century by various “reforms.” We leave

From its private and localised origins, social solidarity evolved into large-scale social welfare systems, expanding the contributor base and continuously lowering the individual risk associated with unemployment, illness, or poverty in old age. These systems safeguarded human livelihoods during economic downturns by providing access to essential services and financial support, while also stabilising the broader economy by maintaining demand and preventing widespread poverty.

1.2. Countercyclical stabilisation.

It is to Keynesian thought that we owe the concept of macroeconomic stabilisation. Before its emergence, modern societies were subject to fluctuations linked to the rhythm of the business cycle, with major periodic crises and few institutional mechanisms to manage them effectively (this lack of support is what pushed workers to self-organise by forming the first mutual aid societies) (Delalande, 2023). Keynes provided a framework for addressing macroeconomic instability through the conscious and rational mobilisation of budgetary, tax and financial tools (Snowdon & Vane, 2005).

The central message of Keynes' *General Theory* is that modern economies have a significantly higher potential growth rate than what they are able to achieve 'spontaneously' (i.e., through decentralised individual decisions). Economies are typically in a state of underemployment equilibrium, yet can grow faster and achieve higher employment levels when autonomous demand rises sufficiently. The multiplier

for another contribution the question of whether this erosion is the result of necessity (linked to the nature and cost of technical progress, and/or demographic changes) rather than the political will of certain social groups able to impose their agenda on the rest of the population.

effect, initially applied to private investment, was found also to apply to exports and autonomous public spending.² Thus, in periods of underemployment, public authorities can use public investment to stimulate growth and employment, which can, in turn, crowd-in private spending and investment (Arestis, 2013). In response to a systemic crisis or shock, the government can consciously and discretionally trigger mechanisms to reduce unemployment, poverty, and uncertainty. In this sense, the Keynesian government acts as a coordinating entity capable of directly influencing macroeconomic dynamics, using public spending as a powerful tool to dampen the effects of downturns through stabilising output and employment levels.

Over time, the discretionary Keynesian model has evolved into a system of automatic stabilisers - mechanisms such as progressive taxation and social welfare programs that adjust naturally in response to economic fluctuations (Maravalle & Rawdanowicz, 2020). These stabilisers provide a countercyclical buffer, ensuring that government intervention occurs without the need for continual discretionary decisions (Karras & Yang, 2022). Even in the face of large-scale shocks, they function as a key mechanism for cushioning economies from severe declines, preserving both economic stability and social cohesion. Autonomous public spending is now only deployed in exceptional cases to fend off deflationary threats (Dolls et al., 2012). The rest of the time, public spending plays a passive and counter-cyclical role, responding inversely to fluctuations in economic activity.

² This idea was vehemently opposed by part of the profession from the end of the 1960s, which (invoking the “crowding out” effects of private spending by public spending and “Ricardian equivalence” where the positive effect of any increase in public debt would be cancelled out by the anticipation of future tax increases) came to consider the multiplier effect of autonomous public spending as negligible, until a series of empirical studies published in the wake of the 2008 global financial crisis led to a re-evaluation of the role of multipliers.

Despite the relative decline of the discretionary Keynesian model, today's advanced economies still possess this valuable century-old legacy, which allows them to respond more effectively to shocks and uncertainty. Though institutions vary from country to country, macroeconomic stabilisation policies play a prominent role in limiting the extent of economic ruin and disintegration when large-scale shocks occur.

2. Beyond shock absorbers

While social solidarity and countercyclical stabilisation policies provide critical buffers against shocks, they are designed for crises that follow relatively predictable patterns, both in timing and consequence. Social insurance was developed to mitigate income shocks from factors like cyclical unemployment, ageing, and illness, while countercyclical policies were designed primarily to address deficits in aggregate demand. These are challenges that, while disruptive, remain at least somewhat predictable. However, in the context of increasingly unpredictable, severe, and frequent 'polycrises', we argue that traditional crisis mitigation approaches may not be sufficient. Today's crises present novel challenges and affect multiple systems, at multiple levels. Global pandemics, extreme climate disasters, and geopolitical instability (especially when occurring all at once) do not conform to the conventional boom-bust cycles that underpin traditional crisis mitigation strategies. With new and varied challenges, it is not enough to dampen the immediate impact of crises. What will be needed is small and large scale innovations, across all levels of society.

There is already a substantial body of literature that recognises innovation as a crucial mechanism for overcoming crisis and adversity (Applegate et al., 2009; Dahlke et al., 2021; Filippetti & Archibugi, 2011; Hausman & Johnston, 2014). Hausman and Johnston (2014), for example, demonstrate how product innovation contributed to economic recovery from both the great depression in the 1930s, and the major economic crisis in the 1970s. Similarly, Applegate et al. (2009) highlight the importance of corporate innovation in overcoming the 2008 global financial crisis. However, while these authors make substantial contributions to the understanding of firm-level innovations during economic recessions, Dahlke et al. (2021) argue that in the face of contemporary crises, not only does the role of innovation become more crucial, but the scope and scale of these innovations also take on greater importance. Here, “against the backdrop of transsystemic crises, the character of innovation as a collective action problem calling for transdisciplinary alliances becomes ever more palpable” (Dahlke et al., 2021, p. 16).

Dahlke et al.’s conception of innovation involves going beyond traditional product-driven, techno-scientific innovations, to include a broader set of innovations emerging from and across multiple actors and systems (Dahlke et al., 2021). For instance, while the response to the Covid-19 pandemic involved product innovations in areas like medical equipment and protective gear, it also involved widespread multi-directional solidarity between individuals, firms, and communities, often underlined by not-for-profit innovations. Private actors shared needed resources by offering pro-bono services; unlikely alliances were formed across industries, from church services being held in drive-in cinemas to large-scale cross-industry collaborations to build ventilators; and firms collaborated with communities, where

joggers delivered food from local restaurants to people in quarantine (Dahlke et al., 2021).

The Covid-19 pandemic provides a case study of various societal actors dedicating themselves to a shared social mission, highlighting two important takeaways. Firstly, that responding to contemporary crises demands both small and large scale innovations, across all levels of society, where the many significant innovations occur through collaborative efforts. Secondly, that humans already exhibit a willingness and tendency to collaborate on innovative efforts to help one another. Consequently, the goal of policy should be to empower individuals, communities, and nations to fulfil their natural tendency to innovate and collaborate, both more effectively and on a larger scale.

3. National Systems of Innovation

A large body of research suggests that the potential for innovation, particularly during crises, depends on the prevailing institutional framework (Filippetti & Archibugi, 2011; Lundvall, 2007; Martin & Sunley, 2015; Scerri, 2020; Tupy & Silva, 2019). This framework can be described through the concept of 'National Systems of Innovation' (NSI), which refer to the network of institutions, structures, and policies within a country that shape and support the innovation process (Filippetti & Archibugi, 2011). Research has linked the strength of a country's NSI to its innovation response during shocks and downturns. Fillipetti & Archibugi (2011), for instance, have demonstrated how European countries with stronger NSIs exhibited a countercyclical innovation response to the 2008 recession, allowing them to be less impacted by the crisis and

more effective in their response. This suggests that strengthening NSI is an important means of enhancing our resilience to shocks and adversity.

Since mainstream definitions of NSI focus primarily on science, technology, and R&D, most efforts to promote innovation centre on strengthening formal institutions such as firms, research institutions, and government bodies (Lundvall, 2007). However, there have been growing efforts to expand the concept of NSI beyond the confines of this 'technonationalistic' framework, recognising innovation as a partially non-technological learning process embedded in social interactions and collective problem-solving, rather than a linear, technologically driven phenomenon (Lundvall, 2007; Lundvall & Johnson, 1994). Within this broader perspective, NSI are not static entities, but dynamic and interactive systems that evolve through feedback loops between institutions (both formal and informal), communities, firms, and individuals (Lundvall, 2007; Scerri, 2020). Lundvall and Johnson (1994) capture this idea through the concept of the 'learning economy', where continuous learning, knowledge diffusion, and interactive collaboration among a diverse range of actors drive the kinds of small and large-scale innovations explored in the previous section.

This broader conception of NSI builds upon the fact that the non-purely technological aspect of innovation assumes a social and cooperative dimension (Siriram, 2022), and thus fits with our core argument: that investing in people, through human development, is crucial for enhancing our capacity to respond to contemporary crises. If innovation is driven through collective learning and collaboration, then systems of innovation cannot be separated from the people that make up these systems. Investing in these people therefore strengthens the foundation on which

both formal and informal institutions of innovation can function, allowing people to make the most out of their institutional context.

There is growing evidence to suggest that human development plays an important role in enhancing society's innovation response to shocks and adversity. Filippetti and Archibugi's (2011) research, for instance, identifies human resources as one of the most critical components of a country's NSI that contributed to sustained innovation during the 2008 crisis. In addition, many studies on regional resilience have shown human development, proxied by education levels, to contribute significantly to crisis recovery, typically through an innovation channel (Di Caro, 2014; Martin & Sunley, 2015; Wang & Li, 2022). All this supports the argument that investing in human development can enhance our capacity to respond innovatively to shocks and adversity. Not as an alternative to institutional, structural, and policy reforms. But as part of a broader approach that includes all of these elements.

4. A simple model

Our argument for why we should increase investment in the human development of all, now that we are facing increased risk of crisis and overlapping crises, can be demonstrated with a simple model.

Imagine a world ruled by a benevolent dictator. Every year, this rational dictator sets the tax rate and invests the money raised to maximise aggregate income. The dictator sets the tax rate such that the marginal cost, in terms of forgone income in the present time period, is equal to the marginal increase in the value of the discounted future stream of income. For simplicity, we assume a static population.

Aggregate income in this world is determined by the level of two factors of production: labour and capital. The dictator can invest in labour (human development) or capital. Income is generated through the combination of these factors such that the returns on a given level of either will increase as the level of the other rises. As a consequence, if one has higher returns and the dictator invests all funds in that factor, a point will be reached when the return of the other reaches the same level or higher. The dictator will then switch to investing in that factor.

Given this dynamic, income will be maximised by investing until the marginal cost of investment (forgone consumption via tax in the current time period) is equal to the marginal return on capital and on human development i.e. all three are equal.

Now we make this world a little more complicated, firstly by removing the most unrealistic assumption (that the dictator is benevolent) and then by introducing the possibility of crisis.

We now assume that the world is made up of two groups of people, the powerful and the disempowered. The income of individuals in each group is a function of the level of human development. Individuals have a genetically determined maximum level of human development, which is normally distributed across the population and so, potentially, both groups could have equal average income. The extent to which they realise their level of human development is a function of prior investments.

The dictator seeks to maximise the income of the powerful, but is constrained by the need to keep a certain proportion of the disempowered above a given income threshold, let's call it the poverty line. The dictator represents the interests of the powerful, hence the focus on their income, while the constraint arises because either it would be intolerable for the powerful to see too much suffering or because higher levels of poverty would be intolerable for the disempowered, leading to conflict. Tax enters into the investment decision based on its impact on the incomes of the powerful and on its impact on the proportion of the disempowered it pushes below the poverty line.

Without the constraint, the dictator will balance investments between the human development of the powerful and capital. Compared to the benevolent dictator scenario, this would lead to an increase in investment in the human development of the powerful, a decrease in investment in capital (as the returns it generates for the disempowered are ignored), and the removal of investments in the human development of the disempowered. Overall, this will lead to higher incomes for the powerful, but lower aggregate income. The constraint softens these impacts. The stronger the constraint, i.e. the lower the tolerable proportion in poverty or the higher the poverty line, the closer the outcomes are to the benevolent dictator scenario.

Let us assume that the powerful are, at the very least, comfortable with a poverty line and proportion below it which leave the disempowered with an average income below the average income of the powerful. Then, compared to the benevolent dictator, this scenario leads to larger investments in the human development of the powerful relative to investments in the human development of the disempowered and

in capital. By serving the interests of the powerful, and allowing a lower average income of the disempowered, the dictator in this scenario has sacrificed aggregate income to increase the average income of the powerful.

We now add in the possibility of a crisis. In this world, when a crisis occurs, it reduces everyone's income until someone identifies an appropriate innovation which mitigates its impact. The probability that someone will identify an innovation is a function of their human development.³

The addition of crisis creates a pathway from investments in the human development of the disempowered to the incomes of the powerful. The higher the levels of investment in the human development of the disempowered, the shorter the average time period between crisis and innovation, and therefore the smaller the impact on everyone's income. If we assume that there are diminishing marginal returns to investing in human development, the impact on income via this innovation pathway would be greater for investments in the human development of the disempowered, given historic neglect. As a consequence, the dictator seeking to maximise the incomes of the powerful, should increase the level of investment in the human development of the disempowered.

The greater the probability of crisis and/or the greater the likely impact of that crisis on income, the greater the potential return on investments in human development in general and in the human development of the disempowered in particular. As the

³ The aggregate probability of innovation is an inverse function of the gap between potential and actual average human development. As the marginal returns of human development are diminishing, there exists a sort of ceiling which means that giving more to some cannot compensate for consistently giving less to the other subgroup.

probability and severity of crises increases, the difference between the dictator's investments in the human development of the powerful and disempowered will approach zero. Adding crises to this simple model is therefore tantamount to tightening the poverty tolerance constraint.

In this world, in good times (low probability of crisis), the dictator serves the powerful best by making the minimal investment in the human development of the disempowered required to keep a tolerable portion above the poverty line. But in difficult times (high probability of crisis), the dictator would increase investments in the human development of the disempowered, simply to protect the incomes of the powerful. The more storm clouds on the horizon, the smaller the optimal difference between the dictator's investments in powerful and the disempowered.

5. The real world

The real world is much more complicated than the simple world discussed above. If the dynamics described in our simple world exist, they exist alongside and are interconnected with a host of other systems. Some of these would reinforce the conclusions, some weaken them. It is, nonetheless, worth considering if the dynamics described are realistic. If they are realistic then we can conclude that there are dynamics at work which, in times of increasing crisis, increase the likelihood that larger investments in the human development of everybody, but especially those without power, is the income-maximising choice of those in power.

As simple as we have tried to make our model world, it is nonetheless underpinned by a number of assumptions. We cannot review them all here, but to determine the realism of the model it is worth considering a few of the most important ones.

In our model, there are people with power, whose interests are pursued by the dictator (government) and shape the investment of resources, and there are people without power. While the real world is not as clear cut, it is obvious that some people have more political power than others, including over how those resources are invested. This is true within and certainly between countries. In the latter case, the model may have something to tell us about the dynamics of international aid.

We assume that for a given level of human development or stock of capital, returns on investments in one will increase as the stock of the other rises. Essentially, we are assuming that income is generated through the combination of the two factors of production. Therefore, the value of a given increase in one depends on the level of the other. For example, the return on an improvement in human development will be greater if there is more capital for it to interact with. This is a reasonable assumption, but we could do away with it without changing the conclusions if we assume, as we do when we extend the model to consider crises, that there are diminishing marginal returns on investments in human development. The realism of this assumption requires some reflection.

We can divide the process of generating a return from an investment in human development into two stages. The first stage is the increase in human development which arises from the investment. The second is the return on that increase. We

would argue that there are strongly diminishing marginal returns in the first stage, to the point that they approach zero. The returns to these increases (stage 2) may well be increasing, but as the changes in human development (stage 1) approach zero, so too will the overall returns. An example may be helpful here.

Consider investments in becoming a faster marathon runner. For an unfit runner, a relatively small investment should yield large returns in terms of increased pace. While for a professional athlete, significant investment is required for even a small increase in marathon pace. In stage 1 then, there are clear diminishing marginal returns. In stage 2, that is not clear. The large increase in pace for the amateur has little value, while the small increase for the professional may well have a large value. This is why Nike was prepared to invest millions in improving Eliud Kipchoge's marathon pace from just above 2 hours to just below, but we have to pay to wear Nike shoes, even if they would help us improve our pace. But humans have limits and Nike would have to spend much more for the next minute of improvement and eventually there will be no discernible improvement, no matter the spend. In the end, the diminishing marginal returns of stage 1 will lead to diminishing marginal returns overall.

The assumption that crises require innovation to limit their impact is not controversial. What does require some consideration is if 'time to innovation' is a function of human development. We could make this a little more interesting and ask, if it is a function, is it a linear function? There is enough evidence to suggest that average levels of human development, proxied for by education levels, help with recovery from crisis (Di Caro, 2014; Martin & Sunley, 2015; Wang & Li, 2022). It is

less clear the extent to which we need the people in the right-hand tail, the Einstein's and such. If we do need them for the more complex crises, then, given that such people are rare, the importance of investing in the human development of the disempowered becomes much more important. To maximise our chances of generating the outliers we need, we have to ensure that as many people as possible are reaching as high a possible level of human development. Maybe it will not be necessary that they reach the absolute highest point, but at least more people should reach the critical point at which they have a much greater ability to be creative. As we do not know the exact form future crises will take, it is, however, not possible to say how much we will need this high level of creativity.

Moreover, it is not clear that you have to invest generally to ensure you are investing in the Einsteins of the future. Arguably, in the real world, you could screen for individuals with high potential and invest more heavily in them. To a limited extent we already do this when we apply merit-based selection to opportunities such as tertiary education. But this is often restricted to a sub-population, and can anyway only be relied on if the screening is implemented and accurate. Moreover, this would only work if we ensure that no potential is lost by the time we reach the age at which screening could be accurate. Given the importance and sensitivity of the early years of life, before any screening would be possible, such an approach would still require a significant generalised investment in this life stage, to ensure we don't lose more Einsteins to malnutrition, poorly treated infectious diseases, or stressful environments.

Until now, the discussion has been based on the unlikely hypothesis that innovation depends solely on a few brilliant individuals lost in the mass of ordinary people. However, in reality, innovations rely less on Einsteins than they do on complex networks of complementary people and institutions. In short, innovation is a process that results from social interactions made up of a subtle mixture of competition and cooperation. Without even mentioning social innovation (which by definition is a phenomenon involving a multiplicity of persons), innovation, even in the narrow sense, is approached by its most knowledgeable analysts as a non-individual phenomenon involving organisations and agglomeration effects (Lazonick, 2009), or networks (Powell & Grodal, 2009) through more or less specific social processes (Carlson, 1991; Pavitt, 2009), and national or regional systems (Edquist, 2009).

In other words, innovation is the archetype of team production where the production function is non-separable. With the cross derivatives being non-zero, the marginal productivities are therefore not individualisable. Thus, it is not possible to reduce this overall production to a sum of several distinct productions: the whole (resulting from social interaction) is greater than the sum of the parts. To return to the previous question, it follows from this that the human development of the greatest number necessarily has a positive effect on network effects and interactions. At the aggregate level, the probability of innovation emergence is linked to the human development of the deprived group because, as the latter increases, the pool of potential interactions allowing innovations to emerge also increases.

Recognising the social dimension of innovation only strengthens the previous conclusion that improving the human development of the greatest number increases

the innovation capacity of a given society, especially when crisis occurs. To be clear, we are not arguing that we should invest in the human development of disempowered people because of the benefits for powerful people. We would rather see a more even distribution of power making this discussion obsolete. But given how power is distributed, we are arguing that as we approach a period of instability, we would do well to face it as well prepared as possible, and that means investing in all people, even if you do not care about them.

6. Human development framework: protection, realisation, and utilisation

Thus far, we have provided an argument for investing in human development as a means to strengthen our collective capacity to innovate in response to crises. We now discuss the nature and scale of investment. We situate the discussion within a framework focused on the process of human development over the life course (Desmond et al., 2021). The framework highlights the role of the protection, realisation, and utilisation of human development potential.

Protection refers to the ceiling of human development. Genetics influence the possible height of this ceiling, but given its environmental sensitivity, the actual height is largely determined by environmental influences, especially in early childhood and adolescence. Even with great genetic potential, if adverse experiences in early childhood and adolescence lead to a low ceiling for a person's future development potential, they will never be able to surpass this ceiling no matter how much investment occurs later in life. *Realisation* is the proportion of protected potential an individual has the opportunity to develop. This process of development is concentrated in childhood, adolescence and young adulthood, but continues

throughout the life course. This means that even if someone has a high ceiling of potential due to supportive early life conditions, they will only be able to realise this potential through developing their capabilities further in later life stages. *Utilisation* refers to the proportion of realised development an individual is able to enjoy, given the environment in which they live. In other words, even with well-developed capabilities, a person can only utilise these capabilities to the extent to which their socio-political-economic context allows them to do so.

Protection concerns a range of biological processes, such as brain development, while realisation relates to learning and skills development, and utilisation to the opportunities individuals have to live the lives they value. The framework highlights that human development is highly sensitive to childhood environments and opportunities, due to their impact on protection and realisation, but that for the benefits of this development to be enjoyed, the environment in adulthood has to be facilitating. The framework points to the need to invest in human development across the life course, and how missing key investments in one stage limits the benefits of investing in other stages.

There is clear consensus in the literature on the types of interventions required to safeguard and develop foundational capabilities in children and adolescents and therefore protect their developmental potential. Early child development (ECD) interventions that provide children with access to food, water, shelter, and medical care are regarded as essential for protecting and nurturing brain development (Masten, 2014a). No less important is a strong and supportive family environment. Here, family-focused interventions such as parental outreach and family health

services are argued to play an important role in supporting the development of neurocognitive mechanisms such as executive attention and self-regulation (Conti & Paredes, 2021; Masten & Obradović, 2008).

For protected potential to be realised, children need the right opportunities. For instance, a strong primary and secondary education is essential for developing basic neurocognitive skills into the knowledge, intellectual abilities, and practical skills needed to navigate adversity (Masten & Obradović, 2008). The family unit again plays an important role in fostering emotional security, modelling adaptive behaviours, and providing a stable support network (Desmond et al., 2022). These elements enable children and adolescents to develop social skills, problem-solving abilities, and emotional strength, which are crucial capabilities for coping with adversity both currently and later on in life (Masten & Obradović, 2008).

For utilisation, Nussbaum (1997) (who refers to what we term capabilities in the utilisation stage as *combined capabilities*) uses the example of political participation to demonstrate how, even if an individual has realised certain capabilities, they cannot fully utilise them unless their context provides the necessary opportunities for them to do so. She argues that participating in political processes requires an individual to develop and realise certain critical thinking and communicative capabilities that enable them to understand the political system and the issues it grapples with. However, even with these capabilities realised, individuals cannot fully utilise this potential if they live in a context that denies them political rights (Nussbaum, 1997).

Since this paper focuses specifically on developing people's capabilities to innovate, we link the utilisation stage in the human development framework to the NSI. In other words, the NSI represents the institutional context in which individuals are able to utilise their capabilities to innovate in response to adversity. There are many ways in which policy can be used to strengthen the NSI. For instance, Lundvall and Johnson (1994) demonstrate how policy can promote innovation through mechanisms such as salaries, patent laws and tax regulations, and build institutional capacity to innovate through providing firms and universities with financial support for organisational innovation, R&D, and experimenting.

7. Scaling up

To maximise innovative capacity then, we must invest in human development to maximise people's protected and realised development potential, alongside ensuring a functioning NSI to allow them to utilise their realised potential. The question is what scale of investment is required.

Research from human resilience⁴ literature suggests that we can protect and realise a great portion of development potential through investments in commonplace adaptive systems. This idea clearly explained by Anne Masten's (2014b) conception of 'ordinary magic'. Masten (2014b) argues that all humans have an innate, almost 'magical' capacity to respond to adversity, so long as they possess a basic set of protections. In her words:

⁴ In developmental science, resilience refers to a person's capacity for positive adaptation in response to adverse experiences (Masten & Obradović, 2008). When referring to an individual's resilience to crises, we are examining their ability to recover from, restore effective functioning, and adapt positively after exposure to said crisis.

Captivating stories of resilient individuals may have created misleading perceptions that resilience is rare and results from extraordinary talents or resources. Evidence strongly suggests, on the contrary, that resilience is common and typically arises from the operation of basic protections (Masten, 2014b, pp. 7–8).

From this perspective, people can protect and realise much of their development potential through interventions focused on nutrition, supportive families, and effective schools and protective communities (Masten, 2014a). These interventions enable individuals to withstand and even positively adapt to adversity. Masten's own research in her book *Ordinary Magic* demonstrates how, despite facing adversity early in life, children who showed basic competences in age-salient developmental tasks experienced higher levels of competence later in life in terms of subjective wellbeing, accomplishments and financial achievements (Masten, 2014a).

These findings suggest that fostering resilience in individuals is relatively inexpensive - people can achieve strong outcomes through very basic interventions. This is why social solidarity interventions are so critical. They provide people with basics, and in doing so, protect and realise a significant proportion of their developmental potential. However, if our goal is to optimise our collective capacity to respond to crises, a social solidarity approach falls short. We must *maximise* these capacities to enable people to operate within their NSI at their highest potential, which requires more than the basics.

Maximising people's developmental capacities demands a more ambitious approach to human development than the current social solidarity model. This does not imply a fundamental shift in approach, but rather extensive scaling up of current efforts. Our proposal is therefore to implement the same types of interventions outlined above but with far greater quality and on a far larger scale. This means providing more support to families, improving the quantity and quality of schooling programmes, and enhancing community support systems. This ultimately requires a radical scale up of spending efforts in these areas. Wealthy families around the world already dedicate vast sums of money to these areas for their own children, in order to provide them with the best possible opportunities and outcomes. We argue that this same mindset and approach should be extended to support vulnerable communities. In other words, we should invest in vulnerable groups not to protect them from adversity, as the current social protection approach does, but to empower them to operate at their full capacity so that they can respond to adversity in innovative ways.

Conclusion

Imagine the economy as a boat, let us say a medium-sized sailing yacht. In this analogy, the speed at which the boat travels represents the growth of the economy, measured in terms of per capita GDP. A faster boat, therefore, signifies a higher rate of economic growth. Like the economy, the boat's speed depends on certain internal features and characteristics. For instance, yachts with long, narrow sails can generate greater speed, just as highly industrialised economies tend to generate greater per capita income growth. Also like the economy, the boat's speed is influenced by external conditions. Calm waters lend themselves to speed just as stable economies lend themselves to growth. Conversely, storms, turbulent waters,

and strong winds pose challenges to our boat, just as financial crises, recessions and pandemics pose challenges to the economy. Since we are limited in our influence on the boat's external environment, our only avenue of influence lies in investing in its internal features. We can invest in features which maximise speed or which improve resilience to storms. The questions then become, how do we maximise the return on our investments, and how should the weather forecast influence our decision?

Maximising the return on our investments requires finding the optimal balance between speed and resilience to storms. This balance differs by context such that the greater the likelihood of storms, the more we need to invest in resilience. Investing solely in speed thus poses obvious problems. This strategy not only relies on ideal conditions of calm weather conditions, but it overlooks the reality that storms are becoming increasingly common. In stormy weather, yachts built only for speed will capsize. In such circumstances, our boat is likely to fare better if we invest more in building its resilience to storms.

This prompts us to consider which investments can best protect our boat against storms. A clear example would be improving the boat's infrastructure to make it sturdier and more durable. For instance, shortening the sails provides greater stability in strong winds, while adding weight to the keel helps the boat remain upright in rough seas. These investments can be likened to strengthening our economy's institutional capacity to innovate, i.e. its NSI. However, while investing in infrastructure is essential for creating a strong and resilient boat, it is not enough to *maximise* our boat's strength and resilience. This is because the extent to which the

boat's infrastructure can help it weather storms ultimately depends on the sailors operating it. In other words, institutional frameworks can only function effectively if skilled and capable people are at the helm, working at their full potential.

Our boat analogy encapsulates our argument for investing in human development. During times of crisis, strengthening our resilience to adversity becomes ever more important. Traditional crisis mitigation efforts such as social solidarity and macroeconomic stabilisation measures are not enough to foster the resilience and adaptability required to confront contemporary crises. What we need are both small-scale and large-scale innovations across all levels of society. The economic responses to crisis we have, social solidarity and counter cyclical measures, were themselves products of innovation in response to turbulent times. But they were designed for crises that follow predictable patterns, and are inadequate in the face of the complex shocks we expect to face in the future, where multiple crises unfold simultaneously and in unpredictable ways. We need to ensure that we have the maximum capacity to develop responses that can address these kinds of crises. This does not come from relying on existing systems, it comes from investing in our capacity to develop new ones.

Our argument implies that austerity measures which sacrifice social spending, along with cuts in international aid are weakening our long-term innovative capacity and therefore reducing our collective capacity to navigate future crises. While the potential for innovation, particularly during crisis, depends on the prevailing institutional framework (Filippetti & Archibugi, 2011; Lundvall, 2007; Martin & Sunley, 2015; Tupy & Silva, 2019), we suggest that well-developed human capabilities

provide the foundation for strong institutions to operate effectively, allowing people to fully leverage their institutional context to combat adversity. This requires the scaling up of social spending and international aid. Moreover, we have stressed that this scale up needs to be substantial. To achieve substantially greater resilience in the face of crises, we need people to operate at their *full* developmental potential. Achieving this requires massively increasing our spending efforts in human development, particularly for vulnerable populations.

Spending on vulnerable people is rarely seen as a transformative strategy that not only dampens the impact of crises, but enhances people's collective capacity to withstand and even bounce back from these crises. In other words, money spent on people is not regarded as an *investment*, in the Keynesian sense. By scaling up our human development approach, we expand the traditional Keynesian stabilisation framework to include people as a core component of investment. This broader conception of investment transforms human development from a protective measure into a tool for fostering innovation in the face of adversity. As such, it is an investment which must be protected from austerity and, in the face of more crises to come, an investment which must be increased.

Our approach is a shift from spending on vulnerable people to minimise harm at the lowest possible cost, to investing in them to maximise their developmental potential. We believe that this will maximise our chances of navigating our turbulent future successfully. It is an approach which recognises that we will do best by facing these challenges together. The alternative is an ever more fractured world, fumbling to deal with challenges because it is operating well below its innovative capacity.

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