REVERSING THE ELITE BRAIN DRAIN: A FIRST STEP TO ADDRESS EUROPE'S SKILLS SHORTAGE

Edoardo Campanella

Since the end of the World War II, Europe has been repeatedly afflicted by waves of brain drain, with varying degrees of intensity across time and countries. But these outflows of human capital have rarely turned into some form of brain circulation, nor have they been compensated by adequate inflows of foreign talents. Now, the Digital Revolution and the economic restructuring imposed by a never-ending Eurozone crisis are amplifying the costs of these human capital losses, creating skills shortages that are undermining Europe's ability to compete globally. So far, the European Commission (EC) has taken steps to loosen immigration policies to attract skilled foreigners from across the world. A thorough historical analysis, however, will show that it is high time for European governments to reattract their runaways. Policies aiming at remigration, rather than immigration, will generate greater political and economic efficiency.[1]

In a world of blurring national borders and growing demand for sophisticated skills, governments struggle to retain their brightest minds. When institutional deficiencies, technological inertia, or political cronyism prevent people from realizing their full potential, no country—even the most developed—is immune to the outflow of its best talents. In this sense, Europe is a case in point. For more than half a century, bright academics, ambitious entrepreneurs, and visionary scientists have defeated the conservatism of Europe by crossing the Atlantic Ocean in search of vibrant university environments and rewarding professional opportunities. These emigrants are not only Europe's most skilled workers but, according to several metrics, also the most gifted in their respective fields globally, with their "quality"—expressed in terms of educational and professional backgrounds—having significantly increased over time. In short, this is the brain drain of "*la crème de la crème.*"[2]

To make matters worse, Europe's outflows of human capital have rarely been

Edoardo Campanella is a Eurozone economist at UniCredit Bank and a junior fellow at the Aspen Institute Italia. Email: edoardo.campanella@unicredit.eu.

compensated by adequate inflows of equally skilled foreign talents from either developed or developing economies. An inward-looking, innovation-averse Europe is not the ideal place for gifted foreigners who are willing to bear the cost of emigration. The number of skilled American workers who decide to move to Europe is much lower than the number of Europeans who are now part of the U.S. workforce.[3] At the same time, the most skilled professionals from the developing world, such as scientists, engineers, and academic researchers, tend to look to the United States as their second home.[4]

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Now, the Digital Revolution and the economic restructuring imposed by the Eurozone crisis are amplifying the costs of these human capital losses by boosting the demand for those very same skills that are usually possessed by European emigrants. On the one hand, the proliferation of digital startups and the emergence of disruptive technologies, such as advanced robotics or machine intelligence, are radically reshaping the business landscape. On the other hand, the bursting of bubbles in oversized real estate sectors and a general lack of competitiveness in the Eurozone periphery call for a radical economic overhaul. These two sets of transformative forces together create skill mismatches that generate high social costs, such as long-term unemployment for displaced workers in declining sectors who are unlikely to find jobs in emerging fields.

Growing skills shortages are already plaguing the European economy. Despite an extremely underutilized labor force, around 27 percent of yearly vacancies in the major European economies go unfilled due to skill mismatches.[5] The Skills Mismatch Index (SMI) for the Eurozone as a whole—an indicator commonly used by the EC and the European Central Bank to gauge skills shortages—is now five times higher than in 2007.[6] Contrary to conventional wisdom, the skills mismatch affects both skilled and unskilled workers, indicating that universities often fail to equip students with adequate and marketable competencies. The situation is expected to deteriorate in the near future. By 2020, Europe's digital sector alone will experience a shortage 900,000 professionals, whereas the dynamic German economy will need 1 million skilled workers in science, technology, engineering, and mathematics (STEM).[7]

Addressing Europe's skills shortage requires both long- and medium-term strategies. National governments, coordinated by Brussels, must invest in lifelong learning programs and reform the education system to better meet the actual

needs of today's employers. But retraining a whole workforce is a challenging task that requires several years to generate some return on investment, if at all. In the meantime, Europe should focus on attracting talent from abroad—although not necessarily foreigners. As a thorough analysis of the human capital flows to and from Europe will show, remigration is far more efficient—politically and economically—than further immigration.[8]

WAVES OF ELITE MIGRATION FROM EUROPE

Without exaggeration, Europe's brain drain is a structural, unresolved problem. Since the end of the World War II, it has been a recurring phenomenon on the continent, albeit with varying degrees of intensity across time and country. By focusing on those periods characterized by the greatest outflows of human capital, this article identifies three great waves of brain drain in Europe over the last eighty years. Table 1 schematically summarizes the features of these mass migrations of talent by reporting their duration (cutoff dates are chosen on the basis of the shocks that triggered the migration wave); the push factors (unfavorable domestic conditions that induce workers to leave); the pull factors (the magnets that attract migrants to a specific place); and the main host countries of such migration.

Table 1.

Migration waves of highly qualified professionals from Europe

	Period	Push factors	Pull factors	Destinations
Reconstruction Wave	1945-1965	Recovery from WWII; Limited resources for scientific research	Research-friendly environment; Smooth transition from war to peacetime; Increased support for research in the race against the Soviet Union	United States; Canada
Internet Wave	1995-2001	Comparatively disappointing economic performance	Explosion of the Internet industry; Growing skills-biased wage inequalities; Pax Americana	United States
Euro Crisis Wave	2008-Present	Post-crisis economic restructuring; Stagnating economies Austerity measures	U.S. Digital Revolution; Linguistic affinity in former colonies	United States; South America; Africa

Europe's first mass migration of high-skilled workers in the twentieth century (the "Reconstruction Wave"), began in 1945 and lasted until 1965. Over this twenty-year period, several scientists and engineers from western and northern Europe escaped the misery of the post-war years (push factor) by moving to the other side of the Atlantic. They also desired to take advantage of the many research

opportunities created by generous U.S. federal funding to win the technology race against the Soviet Union (pull factor).[9]

To draw attention to and halt this hemorrhaging of human capital, in 1963, the United Kingdom's (UK) Royal Society published *The Emigration of Scientists from the United Kingdom,* a report denouncing the loss of British scientists and engineers to the United States and Canada.[10] In the wake of a heated public debate, an article in the *Evening Standard* coined the term "brain drain" for the first time.[11] In the beginning of the first wave, the main losses of human capital were concentrated in the richest European countries; by 1970, however, southern and eastern European countries were supplying the bulk of qualified immigrants to the United States.[12]

Thanks to a comparatively satisfying economic performance in the 1970s and 1980s, Europe regained its appeal, and Third World countries replaced Europe as the main suppliers of skilled professionals to the United States.[13] However, the severity of the brain drain depends more on the amount of human capital conveyed by the emigrants (the quality of the emigration) than on the emigration rates themselves (the quantity). Therefore, by excluding periods characterized by low outflows of workers, one might underestimate the losses of human capital experienced by a country, if the quality of the emigrants was exceptionally high.

With the fall of the Berlin Wall, the global competition for talent once again impeded Europe. Politically, the *Pax Americana* promoted the principles of economic integration and labor mobility. Economically, the rapid expansion of the Internet industry generated increasing demand for sophisticated skills, boosting salaries for knowledge-based jobs and widening the wage gap between the two continents.[14] The combination of these political and economic forces (pull factors) triggered the "Internet Wave," which created a unidirectional outflow of human capital from Europe to the United States in the period from 1995–2001.[15]

During this period, emigration rates accelerated in comparison to the previous decade, but not at such a pace as to create fear of an exodus. On average, across the major European economies, no more than 2 percent of the workforce migrated abroad.[16] Moreover, these outflows were partially offset by the inflow of qualified workers from the rest of the world. According to some estimates, by 2000, the fifteen member states of the European Union (EU15) had suffered a net loss of 0.120 million tertiary educated workers to the rest of the world (only 0.3 percent of its population of highly skilled labor).[17] This might explain the inaction of policymakers.

With the bursting of the dotcom bubble in 2001 and the adoption of more restrictive immigration policies in the aftermath of the September 11th terrorist attacks, emigration rates from Europe to the United States slightly declined.[18] In response to the Eurozone crisis, however, many talented Europeans packed up to

move away again. Over the last five years, crisis-hit countries in Europe's periphery have seen an exodus of highly qualified professionals.

In Greece, where the government cannot even afford to renew its subscriptions to the main scholarly journals, around one-tenth of the Greek academic community works abroad—mainly in the United Kingdom and United States.[19] In 2011, 100,000 skilled professionals left Portugal, responding to the call of their prime minister, Pedro Passos Coelho, who, in a desperate attempt to address the country's job shortage, urged Portugal's young unemployed to move abroad.[20] Nowadays, Europeans are increasingly moving to Africa and South America—not just to the United States, as in the past. And Portuguese and Spanish workers are migrating to their former colonies, seeking to capitalize upon their linguistic affinity with their destination countries.[21]

The Digital Revolution has created exceptional opportunities for skilled professionals in the United States.

While Europe's gloomy economic conditions certainly play a key role in fueling this new brain drain, sweeping technological changes have also contributed to the flight of talent. In particular, the Digital Revolution has created exceptional opportunities for skilled professionals in the United States. Many European entrepreneurs have relocated to California's Silicon Valley, while doctorate students and researchers in STEM fields are also migrating. In 2009, for instance, 16 percent of Irish doctorate holders and 18 percent of German researchers relocated to the other side of the Atlantic.[22] After all, research projects carried out in American institutions lead to more citations and patents.[23]

The above historical analysis provides only fragmentary information on the actual size of Europe's brain drain phenomenon for at least two reasons. First, it only considers flows of workers from and to Europe, not those within the continent. From a purely continental perspective, the exodus of talent from one country to another is a zero-sum game, with the gains of the receiver offsetting the losses of the sender. As a consequence, it is necessary to discard, for instance, the flight of qualified workers from the former Soviet Bloc to Austria and Germany in the aftermath of the fall of the Berlin Wall.[24] Second, the thesis of this article focuses on migrations driven by economic motives, while excluding the flight of persecuted, highly educated European minorities (particularly Jews) between the two World Wars.[25]

LOSING THE BEST AND BRIGHTEST

Each wave of brain drain has its own peculiarities. In some cases, push factors

have played a stronger role than pull factors. Both the Reconstruction and the Eurozone crisis waves were triggered by Europe's desperate economic situation. In contrast, the Internet wave was sparked by extremely attractive opportunities in the United States. At the same time, the main destination of the Reconstruction and Internet waves was the United States, whereas globalization is now pushing frustrated Europeans to almost any corner of the globe.

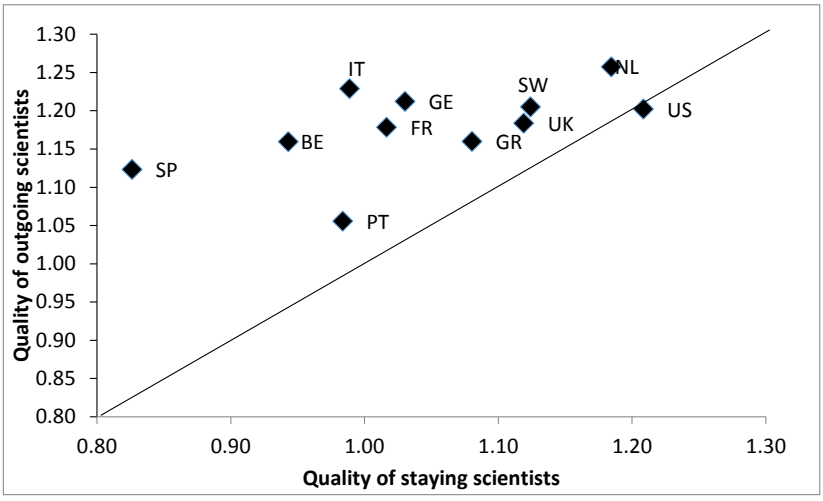
Although the features of each elite exodus varied from period to period, the motivations for skilled Europeans to depart have remained almost unchanged throughout time. As widely described in academic literature on migration, highly qualified migrants move to countries where their skills are rewarded the most ("positive sorting").[26] Higher wages paid by American universities and corporations were already a key factor in the "Reconstruction wave."[27] In the 1990s, widening wage differences between the United States and Europe due to better remunerations for knowledge-based workers and a more favorable taxation structure incentivized many Europeans to leave the continent.[28] According to a recent survey conducted by *Nature*, an international science journal, higher salaries are still an important factor for scientists who are willing to move today.[29]

But more attractive economic conditions alone are not enough to outweigh the costs of migration. There are stronger motivations than high wages that induce people to leave, usually related to systemic deficiencies at the domestic level. According to the aforementioned report by the Royal Society, in the 1950s and 1960s scientists were leaving the British Isles in search of better research facilities and funding offered in the United States.[30] Today, European researchers complain of low investments in research and development, unstable or unattractive academic jobs, and an excessive load of administrative tasks.[31] The exodus is not just confined to academics. Several European entrepreneurs prefer to move to Silicon Valley to circumvent the high regulatory barriers that suffocate innovation in Europe.[32]

Yet, one thing has changed since the first waves of brain drain. The "quality" of the emigrants—that is the degree of emigrants' selectivity along the ladder of labor quality—has dramatically increased over time. According to some productivity indices that weight years of education by their relative wages, between 1985–2006, the amount of human capital conveyed by European emigrants has increased.[33] Moreover, in the U.S. job market, European emigrants earn a sizable wage premium relative to American workers, and this pay differential has increased over the last two decades for those coming from the main European economies, with the exception of Italy. While the premium might represent a form of compensation for the costs of migration, it is also a signal of the above-average skills possessed by many European emigrants.[34]

Figure 1.

Quality of staying and outgoing scientists (1996-2011)



Source: OECD (2013); Author's calculations.

The quality of the academic degrees and professional experiences accumulated by the emigrants are not the most relevant metrics to assess the severity of the brain drain. Other features of the migratory flows, such as the creativity or the intellectual brilliance of the emigrants, are more important but also difficult to measure. Yet, Figure 2, which reports the median quality of leaving (for the first time) and staying scientists in a specific country from 1996 until 2001, attempts to capture this dimension of the outflow of talent.[35] The quality of a researcher is expressed in terms of impact of his or her publications and helps capture the subjective dimension of the brain drain. Ideally, a country should position itself below the 45-degree line and in the bottom-right quadrant of the graph in order to ensure that the staying scientists are of better quality than the outgoing ones. The chart shows that the largest European economies have not only lost some of their most qualified academic researchers but also the best professionals in their fields. Only the United States has been able to retain scientists equally qualified to those who leave. Studies focused on the most cited physicists in the world draw similar conclusions. Those who emigrated from Europe to North America turned out to be most productive, with an average h-index of 63.1.[36]

Looking at the most influential scientists in the world, the United Kingdom, which is the only European country with research facilities comparable to those of the United States, has lost its previous ability to attract future Nobel Prize winners

from elsewhere, turning into a net supplier of Nobel laureates in scientific fields. Between 1967 and 1986, around 25 percent of the Nobel laureates in the United Kingdom were immigrants, whereas in the years from 1987 to 2006 the percentage dropped to zero.[37]

NO BRAIN CIRCULATION, NO BRAIN EXCHANGE

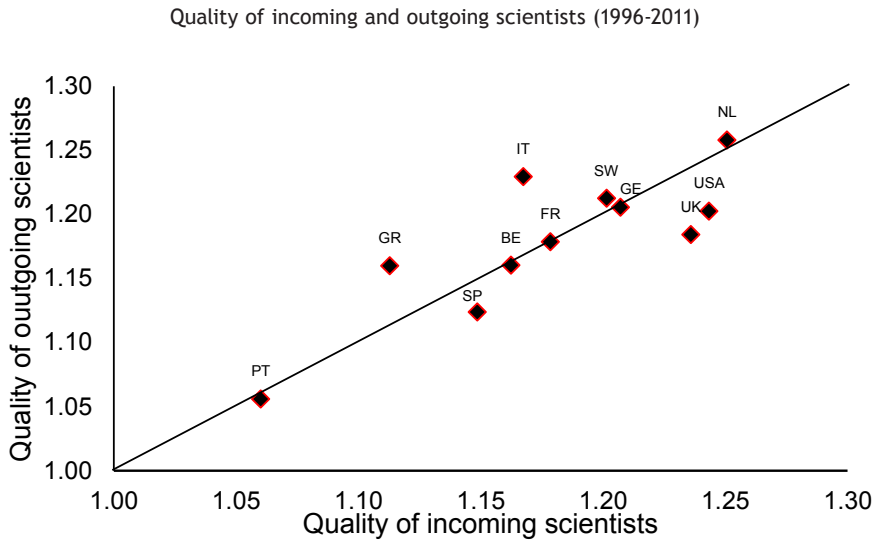
The costs of these outflows of talents are well known.[38] They deplete the stock of human capital, reduce the overall potential (in economic terms) of the economy, and undermine the innovation process. This is to say nothing of the fiscal losses for governments that subsidize or fully fund the education system. Each skilled worker who leaves Europe represents a failed investment—especially if not substituted by an equally qualified immigrant. In Italy, for instance, if one takes into account the whole educational path, the government bears an approximate cost of €500,000 for each graduate student who moves abroad.[39]

Yet, at least in theory, the brain drain is not necessarily a source of concern. In 2007, *Nature* even praised the phenomenon highlighting the positive spillover for the sending country.[40] At some point, if the socioeconomic system radically changes, runaways might return home, fostering the transfer of new technologies, adapting successful business models to the domestic conditions of their motherland, or encouraging fruitful intellectual exchanges with the international labor force.[41] At the global level, virtuous examples of brain circulation are provided by Indian and Israeli engineers, who have contributed to the establishment of thriving information technology industries after having returned to their countries of origin. However, in Europe, when talents depart, they rarely return, or they do so at the end of their careers, when they are less likely to positively influence the system. This is especially true in places that are more in need of human capital, like southern Europe where return migration rates are below 20 percent.[42] In general, the percentage of returning expatriates has declined over the past three decades across the whole continent, with the exception of the United Kingdom.[43] This is a pity because returning academics and professionals are usually more productive and more qualified than those who stayed domestically.[44]

Alternatively, if emigrant talents are unwilling to come back to their countries of origin, the adoption of formal or informal institutions to engage diaspora groups might facilitate the dialogue between emigrants and their domestic counterparts, creating positive spillovers for the home country. The diaspora can act as a conduit for flows of knowledge and information back to the home country. But, given the lack of appropriate policies to engage the diaspora, the European emigrants are usually detached from Europe's domestic affairs.[45]

Of course, developed countries are better placed than emerging ones to replace

Figure 2.



Source: OECD (2013); Author's calculations.

their emigrated minds with talents from abroad. But if domestic conditions are not optimal for native workers, foreigners will inevitably explore other places for more appealing opportunities. According to the Organization for Economic Cooperation and Development (OECD), about 28 percent of immigrants to Europe have a tertiary education compared to 31 percent in the United States, where 40 percent of all OECD immigrants with the highest literacy and numeracy levels reside.[46] Only Ireland and the United Kingdom show percentages close to 30 percent or more.[47] And as shown by Figure 2, which reports the quality of incoming and outgoing scientists, the researchers in science and technology attracted by most European countries are less outstanding than those who depart.

Considering bilateral flows of scientific authors between OECD countries for the years 1996–2011, Europe turns out to be a net supplier of researchers to the rest of the advanced world. During this period, around 42,000 European scientists moved to the United States, Canada, or Australia, and only 31,000 from these countries migrated to Europe. But what is even more worrisome is Europe's inability to attract gifted professionals from developing countries. In 2000, about 20 percent of skilled immigrants originating from developing countries were living in the European Union (EU), whereas around three-quarters of them relocated to the United States, Australia, or Canada.[48]

These differences can be attributed to not just the overall attractiveness of a particular system, but also to the specific national-level immigration policies within

that system. For decades, Australia, the United States, and Canada have adopted selective immigration measures to attract the most qualified, whereas Europe has always focused more on reunifying families and receiving asylum seekers.[49] In the words of economist Giovanni Peri, in the race for global talents, the United States seems to have the ability to attract "the most educated (those with post-graduate degrees), those from the most competitive sectors (science, engineering, management) and, simply put, the most talented (those who end up making major contributions to science)."[50]

The emergence of populist parties all across Europe is making the immigration option politically less palatable.

IMMIGRATION VS. REMIGRATION

Europe's inability to create an environment where brilliant minds—be they native or foreign—can thrive is certainly contributing to the current skills shortage. To stanch the hemorrhage of brains and make the exchange of minds mutually beneficial, the EU has revised its immigration policies. With the implementation of the Blue Card Program beginning in 2011, it has been seeking to attract more high-skilled immigrants. Promoters of this recent immigration measure hoped to attract 20 million highly skilled workers—in particular engineers, corporate strategists, and biotech professionals.[51] However, the results have been quite discouraging so far. In 2012 and 2013, the EU ultimately granted fewer than 20,000 visas.[52]

These numbers will hardly improve in the foreseeable future, with the current Eurozone crisis preventing potential immigrants from moving to Europe. Even when Europe eventually overcomes its economic woes, linguistic fragmentation, heavy taxation, and huge regulatory barriers to innovation will channel the flows of skilled immigration to other regions of the world. According to the Global Talent Index, which ranks countries according to their attractiveness to international talents, only Scandinavian economies make it to the top ten. All other large European economies are struggling in the "war for talent."[53]

In addition, the emergence of populist parties all across Europe is making the immigration option politically less palatable. Nationalist parties are on the rise everywhere throughout Europe and are gaining ground in core countries, be they in France (the National Front), Germany (the Alternative for Deutschland). and the United Kingdom (the UK Independence Party).[54]

For this reason, European policymakers should design policies capable of re-attracting their fellow expatriates. Return migration is politically more appealing than attracting foreign talent, but also economically more efficient. Thanks to the strong emotional attachment to their land, returnees are more dedicated and committed to improving the wellbeing of their communities. Immigrants, by contrast,

struggle to integrate into society—especially in a culturally complex and heterogeneous ones found in many countries across Europe—and are likely to be less engaged in the political life of their host countries. Furthermore, returning emigrants bring back human, social, and financial capital. Thanks to the professional and educational experiences acquired abroad, returnees facilitate the adoption of new technologies, nourish fruitful intellectual exchanges with the international community, and contribute to the establishment of innovation-oriented companies and world-class research institutions.[55]

Consider, for instance, the case of the two French economists of the moment: Thomas Piketty (author of *Capital in the 21st Century)* and Jean Tirole (the 2014 Nobel Prize winner in Economic Sciences).[56] In addition to developing path-breaking ideas, these two scholars have materially contributed to the renewal of their home country. After teaching at top American universities, both economists moved back to France to revive a somnolent academic environment and open it to the world. Piketty helped establish the Paris School of Economics, with Tirole being the founding father of the Toulouse School of Economics. Both institutions train and attract world-class professors, use English as their official language, and produce academic research of the highest standard.[57]

In order to re-attract emigrants, the first and easiest step would be to offer them tax exemptions, ad-hoc job market tracks, special access to credit to create or run a business, and political representation. And, for these measures to be sustainable, reintegration policies should be targeted at specific age groups and skillsets. Engineers, scientists, and digital entrepreneurs—especially those below the age of forty—are the most likely to start new businesses, push outward the technological frontier of the country, and boost growth. But European policymakers should also strike a balance between the short-term benefits and long-term costs of return migration. In particular, those who have never left the country could resent returnees for the privileged treatment offered to them, with such resentment possibly even resulting in challenges to their leadership.

Nevertheless, fiscal or financial benefits are not enough to incentivize the homecoming of brilliant emigrants. In 2001, for instance, the Italian government introduced fiscal incentives to attract talents from abroad. By 2007, only 300 highly qualified Italians returned home, out of roughly 40,000–50,000 skilled emigrants.[58] In 2000, the British government launched a similar program with disappointing results.[59] Considering the caliber of the brains that leave Europe, attractive financial packages are not enough to persuade emigrants to come back. For returnees to fully realize their potential, the whole system must evolve.

For this reason, European policymakers should remove regulatory barriers to innovation, internationalize insular universities, and build public-private partner-

ships. In general, Europe's conservative attitude toward innovators, risk-takers, and disruptors should profoundly change. Even the former president of the EC, José Manuel Barroso, acknowledged this cultural issue. At the Lisbon Council's Europe 2020 Summit in May 2014, he argued that regulation aimed at removing barriers will never be effective for revitalizing the European economy, unless the culture of entrepreneurship changes.[60] But European countries, especially those in the periphery that are most in need of human capital, will struggle to create attractive environments for their runaways.

A NEW APPROACH TO FIGHT THE BRAIN DRAIN

For more than half a century, European policymakers have ignored the brain drain problem, relying on external factors to stabilize and reverse the exodus of Europe's brightest. At the time of the Reconstruction wave, British prime minister Harold Wilson pledged to launch initiatives aimed at stopping the flight of talent, but then backpedalled when the American economy started to contract.[61] During the Internet wave, the bursting of the dotcom bubble, the September 11th terrorist attacks, and optimistic hopes for the newly established monetary union reversed the brain drain once again, thus preventing the adoption of serious reforms to retain the best talents.

Europe cannot disregard this issue any longer. The skills shortage provides an opportunity to retain and re-attract domestic talents by increasing the demand for high-skilled professionals and highly educated academics. If national governments and European institutions do not radically overhaul the entire socioeconomic system, bright people will continue to look abroad to realize their potential, further exacerbating the skills shortage and inevitably condemning Europe to future economic and political irrelevance on the world stage.

NOTES

1 The views expressed within the article are the author's views alone, and do not necessarily reflect those of any affiliated companies or places of employment.

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