



## Brain Drain from Turkey: The Case of Professionals Abroad

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No. 0701

June 2007

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### **Abstract**

The paper presents research findings on the return intentions of Turkish professionals residing abroad. The study uses a descriptive framework to establish the validity of several proposed models of non-return. The results are based on an internet survey of Turkish professionals abroad. Correspondence analysis is used to examine the relationship between return intentions and various factors that may affect this intention. The results emphasize the importance of student non-return versus traditional brain and appear to complement the various theories of student non-return. The respondents appear to come from relatively well-to-do families with highly educated parents. Many have earned their degrees from universities that have foreign language instruction. The recent economic crises in Turkey have negatively affected return intentions. We verify that return intentions are indeed linked closely with initial return plans, and that this relationship weakens with stay duration. Specialized study and work experience in the host country also all appear to contribute to explaining the incidence of non-return. Return intentions are weaker for those working in an academic environment. These results lead to important policy implications, some of which include the training of individuals for academic positions at domestic institutions, supporting study abroad for shorter periods and improving academic facilities in Turkey's newly established universities. The government may support public and private R&D centers to increase the employability of returnees, but also to improve the quality of the higher education system in order to both reduce the need for education abroad and to increase the attractiveness of universities as prospective employment places for those acquiring education and experience abroad.

*Keywords:* skilled migration, brain drain, return migration, return intentions, higher education, Turkey

*JEL codes:* F22, J61, O15

## **Türkiye’den Beyin Göçü: Yurt Dışında Çalışan Profesyoneller üzerine bir Araştırma**

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### **Özet**

Bu araştırmada yurt dışında çalışan Türk profesyonellerin geri dönme niyetleri incelenmiş, geri dönme niyetleriyle ilgili bazı teorik modellerin geçerliliği betimsel bir çerçeve içinde ele alınmıştır. Türk profesyonellerin Türkiye’ye dönme planlarına ilişkin düşünceleri internet üzerinden yapılan bir anketle derlenmiştir. Geri dönme niyetleri ile bu niyetleri etkileyen bazı etmenler arasındaki ilişkiyi belirlemek için uyum analizi (correspondence analysis) kullanılmıştır. Bu çalışmadan elde edilen bulgulara göre, katılımcılar arasında yurt dışı eğitiminden sonra buldukları ülkelerde kalmayı tercih edenler önemli bir grup oluşturmaktadır. Katılımcıların büyük çoğunluğu orta-üst gelir seviyeli, eğitilmiş ailelerden gelmekte olup çoğu yabancı dilde eğitim veren üniversitelerden mezundur. Katılımcıların geri dönme planları yurt dışına gitmeden önce belirttikleri dönme niyetleriyle yakından ilişkilidir. Ancak bu doğrusal ilişki yurt dışında kalma süresinin uzamasıyla zayıflamaktadır. Gerek eğitim gerek iş deneyimi bakımından yurt dışında geçirilen ihtisaslaşma süreci de geri dönme planlarını olumsuz etkilemektedir. Akademik ortamda çalışanların geri dönme niyetlerinin diğer alanlarda çalışanlara göre daha az olduğu görülmektedir. Bu sonuçlara göre Türkiye’deki akademik kadroların yurt içinde yetiştirilmesi ve yurt dışı eğitimin kısa dönemler için desteklenmesi beyin göçüne karşı etkili politikalar olabilir. Ayrıca Türkiye’deki ARGE merkezlerinin desteklenmesi geri dönenlerin yurt içinde istihdam olanaklarını artırarak beyin göçünü azaltacaktır.

*Anahtar Kelimeler:* nitelikli göç, beyin göçü, tersine göç, dönme niyetleri, yüksek öğretim, Türkiye

*JEL kodları:* F22, J61, O15

# Brain Drain from Turkey: The Case of Professionals Abroad<sup>1</sup>

*Nil Demet Güngör and Aysit Tansel*

## **Introduction**

Migration, both internal and across borders, is nothing new for Turkey. A significant amount of rural-to-urban and more recently urban-to-urban migration takes place within Turkey's borders, driven in large part by the greater employment and educational opportunities available in the destination locations. Paralleling this, a significant number of highly educated individuals from Turkey choose to take advantage of overseas employment opportunities. A great proportion of them are part of the phenomenon of student non-return, which means they have also gone through a period of training and education in their country of destination. This reflects in part the lack of opportunities for specialized study within the higher education system in Turkey, as well as the value placed on obtaining a "foreign" education in the domestic labour market.

An increasing number of educated individuals from Turkey are choosing to study and work abroad. Over the past decade, Turkey has consistently ranked among the top ten sending countries in terms of the number of students studying in US higher education institutions. The number of Turkish students in the US grew to about 12,500 in the 2004-2005 academic year (Institute for International Education, 2005). According to UNESCO statistics, approximately 52,000 Turkish students studied abroad in 2004, mainly in Germany, USA, France and England, which made Turkey the 7<sup>th</sup> highest ranking country in terms of gross outflow of students for that year (UNESCO, 2006). UN sources also indicate that Turkey is 24<sup>th</sup> among countries sending skilled workers abroad. These figures make it clear that there is a substantial outflow of educated individuals from Turkey to the rest of the world, which makes skilled emigration an important area of investigation for policymakers in Turkey.

Is there undue concern over the loss of skilled individuals from Turkey? Recent studies have begun looking at skilled migration in terms of a "brain gain", emphasizing among other

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<sup>1</sup> The study is based in part on the Ph.D. thesis of Nil Demet Güngör (Güngör, 2003) supervised by Professor Dr. Aysit Tansel in the Economics Department of Middle East Technical University. Nil Demet Güngör also thanks her examining committee members Hakan Ercan, Yusuf Ziya Özcan, Cem Somel, Fikret Şenses and Erinç Yeldan for their invaluable comments. The support of the Turkish Academy of Sciences Fellowship Program for doctoral studies and the financial support of the METU Research Fund, coded AFP-2000-4-03-06, are gratefully acknowledged.

things the fact that improvements in communications technologies, decreases in the costs of travel and various positive network effects will all contribute to transfer of knowledge between countries. Some studies even argue that just the *possibility* of employment abroad is enough to induce human capital formation in the home country even if migration never takes place (Mountford, 1997; Stark *et al.*, 1997; 1998; Beine *et al.*, 2001). Thus, the economic repercussions of skilled migration appear difficult to untangle. A recent study by Özden (2005: 235) suggests that for Turkey there may be a net loss in human capital, given, for example, that the proportion of those who are university-educated among the Turkish emigrants who migrated to the United States in the 1990s is more than twice Turkey's tertiary enrollment ratio. It is well known that Turkish emigrants to the United States are a highly educated group. According to the 2000 US population census, the proportion of those holding an MA degree or above is 12 percent among the Armenians, 10 percent among the Greeks and 23 percent among the Turks. The similar percentages for those holding a BA degree or above are 27, 20 and 43 percent respectively for the same groups (Şen, 2006).

This article provides new evidence on the characteristics of Turkish expatriates with at least a university-level degree and investigates the factors that are important in their decision to return home or to work abroad. The study uses a descriptive framework to establish the validity of several proposed models of non-return. The data are based on an internet survey conducted by the authors during the first half of 2002<sup>2</sup>. The results indicate that many of the Turkish expatriates surveyed are cases of non-returning students with advanced foreign degrees rather than professionals who emigrated in the traditional sense. Furthermore, there is evidence that long stay durations reduce the likelihood of returning home for a variety of reasons including family considerations. Another important finding is the positive association between initial return plans and a respondent's current return intentions. Those who left Turkey with the intention of returning appear more likely to return than those who initially planned not to return. This positive relationship, however, weakens with the length of stay for respondents with initial return plans. In addition, education abroad appears to increase the likelihood of not returning: Respondents with foreign degrees—especially PhD holders—are less likely to indicate having return intentions. Greater work experience in the host country

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<sup>2</sup> The original study also includes a survey of Turkish students studying in universities overseas. The results of this survey are presented in Tansel and Güngör (2003) and Güngör and Tansel (2007). Bewley (1995, 1998) provides examples of the use of exploratory, descriptive approaches in economics making use of a large interview-based dataset.

also has a negative effect on return intentions. Further, return intentions are weaker for those working in an academic environment. The weakest return intentions are found among those who hold a foreign doctorate degree and who have some work experience in Turkey after completing their studies. The findings of this paper have important policy implications for the Turkish economy in general and for the higher education sector in particular.

The paper has the following structure. The background section provides an overview of the Turkish experience and the next section gives a summary of theories of student non-return. A brief summary of the methodology follows, including an outline of survey procedures and sampling strategies. Subsequent sections give information about respondent profiles and further analysis of return intentions based on the results obtained from correspondence analysis. The final section provides the concluding remarks and policy implications.

### **Background on the Turkish Experience**

The Turkish experience in higher education is comparable to that of Greece (Psacharopoulos and Papakonstantinou, 2005) and Taiwan (Lien, 2006) where a large, unmet demand for higher education has led to record numbers of students studying abroad. The great demand for higher education in Turkey is the result of a number of related factors. A high population growth rate and massive rural-urban exodus has increased enrollments over all levels of schooling in Turkey and created pressure on the higher education system. The demand for higher education partly reflects the value families place on university education as a means for achieving social mobility and prestige. As well, the expectation of greater monetary returns (greater job opportunities and higher pay) also provides a strong incentive for investing in university education<sup>3</sup>.

Because of the inability of higher education system in Turkey to absorb the demand for higher education, many students choose to study abroad. A great majority are private students who go with their own means or are financed by their families. In addition, many students are sent overseas by the government on scholarships in order to train for positions in public institutions as well as both state and private universities. They are expected to return and contribute to the development of Turkey after completing their studies. Unfortunately, even when there is a compulsory service requirement attached to the state scholarships, there is no

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<sup>3</sup> See Tansel and Güngör, 2003 for further details and related references.

guarantee of return; about 15 percent of those who have stopped receiving the Higher Education Council's scholarships have not returned (YÖK, 2005).

Student non-return is not a recent phenomenon for Turkey; the 1968 survey study by Oğuzkan (1971, 1975) revealed that a majority of the 150 Turkish PhD holders participating in the study had earned their last degree from a foreign university. When brain drain takes the form of student non-return, this has important consequences and policy implications. An important difference between skilled migration in the traditional sense and student non-return is that in the latter case, advanced education is received through the foreign university system, which is more geared toward the labour market needs of the host country.

### **An Overview of Theories on Student Non-Return**

There is renewed interest in the various aspects of the international migration of skilled individuals, both by policymakers and academicians. Docquier (2006) provides a recent review of the theoretical and empirical literature. The case of student non-return has also attracted attention (see, for example, Baruch, *et al.*, 2007). Several theories are put forth in the recent literature to explain the phenomenon of non-returning students. In this section, we give an overview of some of the theoretical studies and their implications. Chen and Su (1995), provide a theoretical framework where the incidence of return decreases when advanced education and training both take place in the foreign country of study. This is because education and training received in the country of study is complementary to the production technology, work environment and/or institutional climate of that country. Thus, graduates with foreign degrees will be more productive and earn more if they stay in the country where they received their education and training than if they were to return home.

Wong (1995), alternatively, links brain drain to the learning-by-doing process where learning is the product of experience. The host country has a greater "cumulative base of knowledge" or experience in comparison to the home country, which implies that gaining work experience abroad will allow emigrants to tap this base and hence be more productive and earn more than they would otherwise earn in the home country.

Dustmann (2001) brings together several different motivations for an emigrant's return decision into a life cycle model of migration. Human capital accumulation, savings and consumption decisions are all based on the migrants' return expectations, and differ depending on whether the migration is believed to be temporary or permanent. According to Dustmann (2001: 4) "immigrants who have the intention to remain for shorter periods in the

host countries could be expected to accumulate less human capital which is specific to the host country than migrants with more permanent intentions.” Thus, initial return intentions are expected to play an important role in the return decisions of migrants.

## **Methodology**

The results presented in this article are based on an internet survey of Turkish professionals conducted by the authors at the beginning of 2002. The survey universe is comprised of Turkish scholars and professionals working at a full time job abroad and possessing a tertiary-level degree. The questionnaire included a set of closed-ended questions with an optional open-ended question at the end where respondents could explain their responses or express their views about the topic. No geographical limitations were set for the targeted group, although the search for individuals through university directories and professional associations concentrated mainly on institutions in North America. Non-probability sampling methods were used since random or probability sampling is difficult in a situation where there is uncertainty involved in determining the size and distribution of the targeted group as in the case of the overseas Turkish professionals population. 1224 usable responses were obtained from a combination of internet search and referral or “snowball” sampling methods (Atkinson and Flint, 2001), where those who were contacted initially helped distribute the cover survey letter to their friends or colleagues who they believed met the survey criteria. Although referral sampling may lead to potential biases in responses, it is a fast and efficient means of reaching many potential survey candidates. This means that we cannot claim that the sample is representative of the entire population of Turkish professionals residing abroad. Nevertheless, the diversity of responses received makes this a valuable study for exploring the various characteristics and return intentions of an important group.

## **Respondent Profiles**

### *Gender, Age and Stay Duration*

Three-quarters of respondents are under the age of 40, with a majority being in the 26-35 age group (Table I). Female respondents, who constitute 28 percent of the sample, are generally younger than male participants: 47.2 percent are 30 years of age or younger compared to 32.1 percent for males. Traditionally, both educational and migration opportunities have been greater for men in Turkey. The better educational and career

prospects women face today in comparison to previous generations may explain the younger profile of the female participants. Gross university enrollments of women have risen substantially between the years 1990-2004 although they still lag behind gross male enrollments. The female gross enrollment ratio rose from 8.7 percent to 23.9 percent in this period compared to an increase from 16.4 percent to 32.2 percent for males (TUIK, 2005). In addition, the number of recent female university graduates is about 75 percent of the number of recent male graduates. Similarly, the gender ratio of our survey sample is approximately 40 percent suggesting that males show a greater tendency to migrate than females.

[Take in Table I]

About 70 percent of respondents reside in the United States. The remainder resides mainly in Western Europe, Canada and Australia. The concentration of respondents in North America is due to fact that a considerable amount of effort was spent in collecting e-mail addresses from this region. Table II gives the stay duration of respondents. A third of respondents have a stay duration of between 6 and 15 years. Slightly more than half of females (55 percent) have stayed in their current country of residence for five years or less. The same share for males is only 43 percent. These figures indicate that that the sample is tilted toward relatively younger individuals with shorter stay durations. From the point of view of policymakers, the return intentions of this younger group is especially important since this group faces a longer time horizon for working and contributing to the home or host country.

[Take in Table II]

### *Socio-Economic Background*

Parental educational attainment levels are an important indicator of the socio-economic status of respondents. Table III presents the breakdown of parental educational attainment levels by gender, which reveals that the respondents' parents are, in general, highly educated. In particular, both the mothers and fathers of the female respondents have higher education levels than that of the male respondents. This is similar to the finding of Tansel (2002), who reported that the association between a child's education and her parents education is stronger for girls than for boys in Turkey. In the case of female respondents, nearly half of all mothers and three-quarter of fathers hold a tertiary level degree. For male participants, this is somewhat lower: a third of mothers and a little more than half of fathers hold tertiary level

degrees. By contrast, the average years of schooling for Turkey's 25 years of age and older population in 2000 is only 5.7 years<sup>4</sup>, which corresponds to approximately the primary level of schooling<sup>5</sup>. It is clear from these figures that the respondents come from relatively well-educated and presumably well-to-do families who were able to invest in the higher levels of education in Turkey. Given that Turkey has one of the worst income distributions in the world and ranks among the top twenty countries in terms of income inequality (Sönmez, 2001), it is apparent that the existing opportunities for investing in education, both in Turkey and abroad, are concentrated among the more educated and wealthier households.

[Take in Table III]

### *Foreign Language Instruction in Turkey*

Foreign language instruction, which is a hotly debated topic in Turkey, prevails in private high schools and in some public high schools<sup>6</sup>. Families believe that high schools with foreign language instruction provide an important advantage in terms of getting their children placed into one of the better university programs in Turkey. In addition, knowledge of a foreign language is seen to be an important asset in the job market. This has prompted many new private universities to adopt English as the language of instruction in order to attract students. Those who oppose foreign language instruction and the adoption of foreign course curricula in schools suggest that this facilitates the acculturation process and exacerbates the brain drain (Doğan, 1996 and 1998). This latter view seems to bear some truth since more than half the survey participants (55.4 percent) have graduated from high schools with foreign language instruction. It is also not surprising that a majority of respondents have earned their undergraduate degrees from universities that have foreign language instruction, such as Middle East Technical University (METU), Boğaziçi University and Bilkent.

In addition, an important share of respondents have obtained their undergraduate degrees from a foreign university (11.5 percent). The significant share of foreign undergraduate degree holders may be attributed to a large degree to the unmet demand for higher education in Turkey, since only about a third of applicants to higher education

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<sup>4</sup> Calculated from TUIK (2003), Table 3.9, p. 51.

<sup>5</sup> This was the compulsory level of schooling until 1997, after which compulsory education was extended to eight years.

<sup>6</sup> In the mid-1980s, state high schools called Anatolian high schools (*Anadolu Liseleri*) were formed where English was the language of instruction in math and science classes.

institutions can be placed in a university program each year (YÖK, 2004: p. 32). Pressure from the centralized university entrance examination adds to the anxieties felt by students and makes foreign educational opportunities more appealing. There is also indication that the filtering and recruitment of promising students by foreign educational institutions occurs early on, especially through established high schools, such as Robert High School in İstanbul. Because of their international reputation, these high schools are able to select some of the best students in the country through the centralized national entrance examination at the secondary level. As reported in the popular press, promising students in these institutions in turn attract the attention of foreign recruiters.

#### *Highest Degree Held and Fields of Study*

A majority of respondents hold a masters degree (41 percent); this is followed by the doctorate (37 percent) and bachelor's degrees (22 percent). Engineering and technical sciences constitute the most common field of study at all levels of education, followed by the economic and administrative sciences. These two broad fields account for 84 percent of respondents with bachelor's degrees, 89 percent of respondents with master's degrees and 70 percent of respondents with PhDs. Together, the mathematical & natural sciences and medical & health sciences fields account for a significant proportion—more than one-fifth—of doctorate holders. The greater share of respondents in the technical fields may reflect in part the greater demand for technical skills in the country of residence.

More than two-thirds of respondents have obtained their highest degrees from a foreign country and this is generally at the master's or doctoral level. Table IV gives the level and country of the highest degree held. Of those who received their highest degree from Turkey, more than half hold a bachelor's degree, about a third hold a master's degree and only one in seven hold a doctorate. Thus, a majority of respondents working abroad are those who have studied abroad at the post-graduate level.

[Take in Table IV]

#### *Initial versus Current Return Intentions*

Respondents' return intentions prior to going abroad serve as a gauge for initial attitudes about returning to Turkey. Initial return intentions at the outset may be important for the subsequent decision to stay abroad or to return to Turkey as suggested by Dustmann's (2001) model. Half of all respondents (52 percent) indicated that they intended to return prior to

leaving Turkey, while only 12 percent indicated they left without the intention of returning. The remaining 36 percent of respondents were undecided. In terms of current return intentions<sup>7</sup>, about a quarter of the respondents have indicated that they definitely intend to return, while slightly more than a third are less certain about returning. Another third indicate that it is unlikely for them to return, while about 7 percent say they will definitely *not* return. A strong, positive relationship exists between initial and current return intentions (Table V). Current return intentions are more likely to be in favor of remaining abroad when initial intentions are also to not return. This positive relationship is weaker, however, when the initial intention is to return than when the initial intention is not to return..

[Take in Table V]

### *Family Considerations*

Mobility is often a family decision and family considerations are expected to play a prominent role in return intentions. There is considerable family support for the initial decision to go abroad and for the decision to settle abroad. Three-fifths of respondents have indicated that their families were “very supportive” in the initial decision to study abroad, while about 10 percent indicated that they were “not very supportive” or “not at all supportive”. On the other hand, less than a third of participants indicate that their family “would definitely support” them in the decision to settle permanently outside Turkey. Thus, a higher proportion of families were supportive of the decision to study abroad compared to the decision to settle abroad.

The majority of respondents (58.7 percent) are married. Of those who are married, more than a quarter are married to a foreign spouse. Not surprisingly, marriage to a foreign spouse reduces return intentions considerably, while marriage to a Turkish spouse has a more ambiguous effect on return intentions: More than two-thirds of respondents with foreign spouses indicate they are not likely to return, compared to one-third for respondents with Turkish spouses. Although we are not able to observe a change in return intentions over time as a result of marriage to a foreign spouse, this is likely to be an important factor behind the considerably reduced return intentions of those with foreign spouses.

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<sup>7</sup> Current return intentions are respondents’ intentions about returning to Turkey at the time of filling out the survey.

### *Current Organizations and Occupations*

Close to half (46 percent) of respondents are working in multinational corporations, while 17 percent are working in other *private* firms. Slightly less than a third are working in a university (22 percent), research center (3 percent), or in a hospital/medical center (3 percent). About 43 percent of respondents found their current job while in their current country of residence, while 30 percent were located in Turkey and close to 30 percent were located in another country (Table VI). It appears that many respondents have used their own initiative to contact potential employees by sending their curriculum vitas. A greater proportion of respondents (30 percent) who found their full time job while in Turkey or in a third country have made use of informal channels (e.g., friends and colleagues) compared to those who found their current jobs while in their current country of residence. This points to the importance of information exchange through informal channels for taking advantage of work opportunities at a global level.

[Take in Table VI]

A little over one-fifth of the sample of professionals is working in academic positions in institutions of higher education. The sample is roughly equally divided between “managerial occupations”, “computer & mathematical science-related occupations”, “architecture & engineering occupations”, “higher education” and the remaining occupations. The first four broad occupation groups thus account for about 80 percent of the total sample. The remaining fifth is divided mainly between those in business and finance and those in the life, physical and social sciences.

Return intentions are weaker for those working in an academic environment: 46 percent are either unlikely to return or are definitely not considering returning, compared to 36 percent for the non-academic group (calculated from Table VII). Only a fifth of respondents in academe are definitely planning to return. The proportion of respondents with definite return plans is not significantly different from each other in the other occupations where approximately 30 percent of respondents have definite return intentions.

[Take in Table VII]

### *Reasons for Going Abroad*

Respondents were asked to choose the *most important* reason for initially pursuing international education or employment opportunities (Figure 1). Many respondents (about

one-sixth) selected taking advantage of educational opportunities as the most important reason, because many believe that international study programs offer higher quality education in their chosen field of study compared to universities in Turkey. This was followed by “other” reasons, the need for change, lifestyle preference, and the lack of facilities and necessary equipment for carrying out research in Turkey.

[Take in Figure 1]

Some of the participants did not feel that the categories presented to them adequately represented their reasons for going, and a substantial number of respondents (13 percent) chose the “other” category. The “other” reasons included: gaining international work experience / global business vision; being part of an inter-company transfer; being invited by the foreign country employer; being frustrated with corruption in Turkey and wanting to be part of a more professional work environment; to postpone / delay / shorten the military service obligation; to get an “acceptable” doctorate; the belief that little value is placed on science / technology / knowledge / academics in Turkey; to be able to use the latest technology not available in Turkey; disagreements with the Higher Education Council in Turkey; to work with and learn from the best in their chosen field of specialization; more opportunities for international recognition and mobility, higher quality undergraduate and post-graduate education; political and social disorder in Turkey prior to 1980; and wanting to be in an economically stable country. While some of these reasons are similar in spirit to the categories presented in the survey, they provide somewhat more detailed explanations for why participants have chosen to go abroad.

Some participants also viewed overseas experience as a personal challenge to grow as individuals in the absence of “a family support structure”, and some as a way to discover their “professional abilities and limitations, in a high paced, competitive, international environment.” For some, the opportunity to receive better quality education and to get away from the stress of preparing for the nationwide university placement exam (ÖSS) also figured in as important reasons. It is worth noting that many respondents believe that they will have better employment opportunities in Turkey in terms of both workplace quality and better positions if they acquire overseas study and work experience. For those contemplating an academic career in Turkey, overseas experience is often a requirement for tenure track positions at some of Turkey’s best universities, and this can act as a significant “push” factor.

The top reasons for going abroad differ according to the highest degree completed. The need for change and lifestyle factors are given greater importance by bachelor's and master's degree holders, while those with doctorate degrees give importance to research-related factors. There are also gender differences where female respondents are more constrained by family rather than individual considerations. These findings indicate that the initial factors that are important for deciding to study or work overseas differ with the level of specialization in higher education and in terms of gender.

### *Reasons for Not Returning*

Table VIII presents the reasons for not returning in terms of various push and pull factors.<sup>8</sup> Economic instability is the top push factor: 84 percent of professionals indicate that economic instability is either a “very important” or “important” reason for not returning. This is to be expected since unemployment among high school and university graduates reached nearly 30 percent in the aftermath of the February 2001 economic crisis according to the *2002 Household Labor Force Survey* results (TUIK, 2002). Indeed, respondents with shorter stay durations who constitute a significant proportion of survey participants tend to place greater importance on economic instability as a push factor. Thus, economic crises in Turkey appear to have led to an increase in the number of individuals working and studying abroad.

Bureaucracy (79.4 percent), unsatisfactory income levels (68.4 percent), political instability (64.7 percent) and lack of opportunities for advancing in occupation (61.7 percent) follow economic instability as the next most important push factors. Less than a quarter of respondents chose an “unsatisfactory social and cultural life in Turkey” as an important push factor. Many of those who marked the “other” category included corruption (bribery, partisanship, nepotism) and, in the case of male respondents, compulsory military duty as important push factors.

[Take in Table VIII]

The top pull factors complement these results. The majority of Turkish professionals indicate that a higher salary in the host country is a “very important” or “important” pull factor (79.1 percent). Three-quarters also indicate that a more organized / ordered

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<sup>8</sup> “Push” factors are those characteristics or circumstances of the home country that prompt a person to migrate to another country, while “pull” factors are the characteristics of the receiving country that provide incentives for individuals to settle in the receiving country.

environment and greater opportunities for advancement in occupation are very important pull factors.

A common view expressed in the survey by those who have chosen an academic career is that there is a lack of value given to science and to academics in Turkey, and many carry the fear that they will find themselves in an “unproductive environment” when they return. Unfortunately, many respondents contemplating an academic career after completing their studies abroad are hesitant about working in newly created state universities in Turkey, even when they have a service obligation. A respondent with a compulsory service requirement in a newly established public university, for example, was told by the university’s administration that he would be “lucky if he could find a chair and a table let alone a computer” when he returned after completing his PhD in the United States. They told him there was little they could offer him and that he would be more useful if he stayed in the United States!

[Take in Table IX]

In general, private universities are viewed as offering better conditions than the state universities, especially those that are located in the less developed regions of Turkey. While many academic participants would be willing to work in state universities with established reputations, there is no guarantee that those who return will be employed in one of these institutions as one respondent indicates:

As I had a firm belief of returning and giving back what was given to me by my country after my PhD in 1975, I taught at ODTU in 1975-77, and Bogazici, 78-80. I returned to USA because of political turmoil; moved to Sydney to join my partner in 1989. I am now an academic living abroad; in 1993, I came and presented myself to ODTU and Bogazici; had I been offered a job, we would have moved back.. I still maintain very close contact, and participate in training and development [activities].

Respondents’ comments provide a more detailed account for why many professionals are choosing not to return to Turkey. The Appendix gives a sample of some of the explanations given by the respondents, as well as suggestions for remedies. Anecdotal evidence indicates that the inability to find satisfying work is a relevant factor in looking for overseas jobs in the non-academic private sector. Many university graduates do not work in their field of study, but in unrelated sectors. Lack of planning or knowledge when making study or work decisions also appears to contribute to the drive to go abroad to work or study among young people in Turkey. It is not difficult to imagine that a considerable number of the young are influenced by their peers and by societal pressures (e.g., to conform to society’s norms) to do what is acceptable in terms of career and life choices. Important decisions about

which field to study are made without full awareness of fields and career opportunities and many try to get into popular fields regardless of their aptitudes.

According to some respondents, society views going abroad to study or work as an important measure of “success” and it is for this reason that many are prompted to look for overseas study and work opportunities. Once abroad, it is difficult to return especially if there is uncertainty and lack of information about opportunities in Turkey. Some respondents make it clear that return would be easier if the government or firms in Turkey helped them become aware of career opportunities and professional activities in Turkey and actively promoted their return. It is apparent that there is inefficiency in the education system that is reflected as a lack of planning at the individual level through the education and career choices people make (which appears to be a response to the current education system and labor market conditions) and lack of planning at the national or institutional levels.

#### *Contributions to Turkey during Overseas Stay*

In the literature, the contributions of emigrants are referred to as “diaspora externalities”. In the case of Turkish emigrants, such externalities are believed to be of limited importance since highly educated skilled Turkish emigrants in North America establish themselves with the larger community of professionals rather than identify with an ethnic Turkish community and the concerns of their home country. While other ethnic groups have a long history of lobbying abroad this is a more recent phenomenon for the Turks abroad.

Many respondents believe they contribute positively to Turkey by increasing knowledge about Turkey in the country they are staying. About 40 percent are involved in lobbying activities on behalf of Turkey. Over one-third believe they have helped increase professional contacts between their colleagues in their host countries and colleagues in Turkey. Over a third has also donated to Turkish organizations (36 percent). Some (mostly those in academe) have participated in conferences and teaching activities in Turkey, which is a potential route for knowledge transfer. Those in academe also help Turkish students find scholarships in their institutions. Some of the respondents have been very active in terms of increasing contacts and knowledge transfer between their current residence and Turkey. On the other hand, others believe that the right environment in Turkey must be created before their knowledge and skills can be put to efficient use. Some respondents believe that employees working in institutions in Turkey view returnees with overseas degrees or work experience as a threat and as a challenge to the positions they hold, and that this obviously is not conducive to creating

the right institutional climate for return. Another externality discussed in the literature is the flow of remittances. There is no evidence on the amount of remittances associated with the skilled versus non-skilled Turkish emigrants. However, Faini (2006) finds that brain drain is associated with a smaller flow of remittances.

## **Further Analysis of Return Intentions**

### *Stay Duration and Return Intentions*

Dustmann (2001) suggests that migration is a planned decision: Migrants decide on how much to save, consume and invest in human capital based on whether they intend to stay abroad permanently or for short periods. Migrants tend to invest more in host country-related capital if the stay is viewed to be permanent. This is expected to reinforce the initial plan not to return. Respondents with less permanent stays in mind will also behave accordingly, but as the length of stay in the host country increases, return plans inadvertently change. In this section, we investigate the implications of the Dustmann model for the relationship between stay duration, initial and current return intentions.

Figure 2 illustrates the relationship uncovered by correspondence analysis (CA)<sup>9</sup> between the initial and current return intentions of survey participants and their length of stay in the current country of residence. The boxed categories represent current return intentions, while the remaining points represent the categories of the combined “stay duration” and “initial intention” variables. The initial intention variable has three categories—return, uncertain, and stay—that are indicated by R, U, and S respectively.

[Take in Figure 2]

Two things are noteworthy: first, initial intentions are positively associated with current return intentions, and secondly, this positive association between initial and current return

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<sup>9</sup> This is a very useful inductive method for analyzing and interpreting the associations in large datasets comprised of categorical variables. Correspondence analysis is a multivariate technique that looks at the associations between the categories of a set of qualitative variables. Simple correspondence analysis (CA) gives a visual depiction of the relative proximity between two categorical variables as measured by the chi-square distance. This methodology allows the associations between the categories of a set of variables to be described in terms of a small number of dimensions. It is thus similar to principal components analysis, which is used to uncover common dimensions among a set of continuous variables. One of the advantages of correspondence analysis is that it doesn't require making any restrictive assumptions about the characteristics of the dataset (see Clausen, 1998 for further details).

intentions weakens with the length of stay. For example, survey participants who have stayed for less than a year in the host country and who have also indicated an initial intention to return are associated with definite return plans. Return plans weaken for the group with initial return intention when the length of stay increases to between one and five years, and weakens further still when the duration of stay is longer than five years. The same pattern holds for those who were initially uncertain about returning; as stay duration increases, the likelihood of returning declines. Those with an initial intention of not returning (staying) lie close to the “unlikely to return” and “definitely not return” categories regardless of stay duration. Thus, we verify that return intentions are indeed linked closely with initial return plans, and that this relationship weakens with stay duration.

#### *Work Experience at Home and Abroad and Return Intentions*

Previous work experience, in Turkey or abroad, is likely to be an important determinant of return intentions. The great majority (70 percent) of the survey participants have held one or more full-time jobs in Turkey. Work experience in Turkey could have two possible effects on return intentions. Respondents who have held a full time job in Turkey have firsthand knowledge of the work environment and work conditions in Turkey and are, therefore, able to make comparisons based on this information. Those who judge work conditions to be worse in Turkey are more likely to remain abroad. Having work experience in Turkey may also increase the chance of return since individuals with previous experience in Turkey can re-adapt more easily to an environment they already have knowledge about when they return.

Full-time overseas work experience is also expected to be important in determining who is more likely to return to Turkey. Return intentions are expected to decrease with an increase in the number of years of work experience in the host country as suggested by the learning-by-doing, experience-based brain drain model developed by Wong (1995). Many of the respondents (about 30 percent) have limited (one to two years) overseas job experience. Type of job experience (e.g., how specialized and specific it is to the host country) is also expected to be important in determining return intentions. These issues are examined further in the following sub-sections.

#### *Specialized Training and Return Intentions*

Transfer of knowledge and technology may be difficult when the training received abroad is highly specific to an organization or to an industry that is not developed in the home

country. When the advanced education and training received abroad is geared toward the labour market needs of the host country, this is believed to lower the incidence of return, since graduates with foreign degrees expect to be more productive and receive higher incomes in the country where they received their education and training (Chen and Su, 1995). To determine the impact of specialized training on return intentions several questions were asked about the type of training received abroad—whether general, specific to industry or specific to the current organization (Table X). Only 3.5 percent of respondents received formal training that is specific to the organization they are working for. This is somewhat higher (about 10 percent) for informal on the job training. There does not appear to be a significant relationship between the type of training and return intentions, as one would expect from the theory.

[Take in Table X]

Respondents were also asked to assess the percentage of time they spent on various job-related activities abroad<sup>10</sup>. About a fifth of respondents indicated that they spent the majority of their time in computer-related activities since a good proportion of participants are in computer-related occupations, while more than a third spent the greater part of their time on the job in research and development activities. R&D activities constitute highly specialized work that may be difficult to find in Turkey. As such, one would expect return intentions to decrease with increases in the R&D content of the overseas job. However, we found no discernible positive or negative association between the R&D intensity of job activities and return intentions.

#### *Location of Highest Degree, Work Experience and Return Intentions*

Correspondence analysis reveals the response pattern of three separate groups in terms of their current intentions about returning to Turkey (Figure 3). The three groups are 1) those who have obtained their highest tertiary-level degree from a Turkish university, represented by *HDTUR*; 2) those holding their highest degree from a foreign institution and whose first full time job after completing their studies is located outside Turkey, whether in the same city or same country [*HDFOR(samecity)*; *HDFOR(samecountry)*] as their studies or in another country [*HDFOR(dif\_country)*]; and 3) those with a foreign highest degree who initially

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<sup>10</sup> These job activities are the same as those in the US National Science Foundation's Survey of Doctorate Recipients.

returned to Turkey to work after completing their studies and then went abroad to work, represented by *HDFOR(Turkey)*.

[Take in Figure 3]

The upper-left cluster of Figure 3 reveals that those who have obtained their highest degree from a Turkish university appear to be closely associated with definite return intentions. The second group, forming the bottom left cluster, represents the phenomenon of student non-return—those who have remained abroad to work after completing their studies. The members of this group appear less definite about their return intentions; the co-ordinates of the points representing this group lie close to the “return probable” and “return unlikely” points.

The third group forming the center-right cluster differs from the other two in that it comprises those who returned to Turkey to work at a full-time job immediately after completing their studies at a foreign university and who then decided to go abroad again to work. The members of this group appear more likely to indicate that they will definitely not return to Turkey. If intentions translate into reality, it would appear that the migration of professionals—or brain drain in the traditional sense—as measured by those whose highest degree is from a Turkish university, is less of a concern than non-returning students for Turkey’s brain drain problem. Even more troublesome is the third group of returning students who have experienced working in Turkey after completing their studies; they appear to be the least likely to return to Turkey. These findings provide support for both Chen and Su (1995)’s model of student non-return where overseas education and training increase the likelihood of not returning and Wong (1995)’s model where experience in the host country is more productive and has higher returns than experience in the home country making employment in the host country more attractive.

#### *Level of Highest Degree, Location of Initial Work Experience and Return Intentions*

Disaggregating the three groups by level of highest degree (bachelors, masters, or doctorate) also reveals interesting information. Figure 4 presents the correspondence analysis of return intentions for respondents differentiated by their level and location of highest degree (*FOR\_bach*, *FOR\_mast*, *FOR\_PHD*; *HDTUR\_bach*, *HDTUR\_mast* and *HDTUR\_PHD*) and whether they initially started work in Turkey or a foreign country after completing their studies (*workTUR*, *workFOR*). Since the level of highest degree is an indication of the level of

specialization achieved by the respondent through formal study, a pattern of non-return for students with foreign doctorate degrees will provide some confirmation that specialized training in a foreign country has an adverse impact on return intentions (Chen and Su, 1995).

[Take in Figure 4]

Figure 4 shows that respondents with a foreign highest degree, regardless of level, are more disinclined to return while those holding their highest degrees from Turkish universities appear to have definite return plans. Respondents with foreign doctorate degrees who also have some work experience in Turkey after completing their studies appear to have the weakest return intentions. According to one survey respondent working in academia, readapting to Turkey after having spent 5-10 years abroad is difficult because Turkey goes through a much faster cultural change than the host country.

### **Conclusions and Policy Implications**

While educational attainment levels in Turkey have shown improvements over time, the rise in education levels has been insufficient to close the education gap with the developed countries. Given the higher education profile of those who leave Turkey compared to those remaining, skilled emigration and non-returning students appear to be an important issue for policymakers in Turkey involving great private and social costs to Turkish society.

The article provides the results of an internet survey of university-educated Turkish professionals residing overseas. Survey participants view overseas work and study opportunities as a means for investing in themselves and as a way to increase their value in the marketplace in Turkey and abroad. The quality of both the work environment and the greater career and study opportunities appear to carry weight in the decision to go overseas. The survey results also emphasize the importance of student non-return versus traditional brain drain and appear to complement the various theories of student non-return.

Economic instability and crisis are at the forefront of the recent discussions of the Turkish brain drain. The economic crises in Turkey have affected not only the unskilled labour force, but educated, white-collar workers as well. This, in turn, appears to have had a negative impact on the return intentions of university-educated professionals working abroad as well as encouraging out migration. Economic instability makes it hard for planners, producers and investors to make plans and invest for the future.

The respondents appear to come from relatively well-to-do families. Their parents are, in general, highly educated compared to average educational attainment levels for Turkey as a whole. In addition, many respondents have earned their degrees from universities that have foreign language instruction. Many Turkish professionals working abroad are non-returning post-graduate students rather than holders of higher degrees obtained in Turkey who subsequently moved. Since participants with foreign degrees are less likely to return, student non-return compared to professional migration appears to be of greater concern. Respondents with a foreign highest degree have weaker return intentions than those with a highest degree from a Turkish university, which supports Chen and Su (1995)'s hypothesis that overseas education and training is an important cause of student non-return. Further, the weakest return intentions are found among those with foreign doctorate degrees who also have some work experience in Turkey after completing their studies. Another important finding is that return intentions are weaker for those working in an academic environment. This is especially important for Turkey, as there are now recently established state universities (an additional 15 just within the past year) in all regions of Turkey that have difficulties in hiring qualified academic personnel.

The study also finds a strong, positive association between initial return intentions and current return intentions. However, this association is weaker for those who initially intended to return to Turkey. In general, those who had left Turkey with the intention of returning appear more likely to return. Similarly, respondents who had initially planned not to return are more likely to have current plans to remain abroad. Our results on the importance of initial return intentions support Dustmann's (2001) model of migration. In addition, return intentions are considerably weaker for those who have stayed longer in the host country. This suggests that policies to send students to study abroad on government scholarships should concentrate on giving support for shorter periods of study.

Specialized study and training abroad makes return difficult. As some of the respondents have stated, lack of work opportunities in their area of specialization is an important reason for not returning. Therefore, scholarships should be given in areas that are supported by the current needs of the higher education system and labour markets conditions in Turkey.

These results lead to important policy implications, some of which include the training of individuals for academic positions at domestic institutions, supporting study abroad for shorter periods and improving academic facilities in the newly established universities. Already, there is evidence of several governmental agencies moving in this direction. For

example, State Planning Organization supports domestic training of individuals and TUBITAK (The Scientific and Technological Research Council of Turkey) supports short term postdoctoral training abroad. The government may support public and private R&D centers to increase the employability of returnees, but also to improve the quality of the higher education system in order to both reduce the need for education abroad and to increase the attractiveness of universities as prospective employment places for those acquiring education and experience abroad.

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**Table I.**  
Respondents by age and gender (%)

Age	Male	Female
<26	4.6	7.5
26-30	27.5	39.7
31-35	26.5	24.9
36-40	13.4	8.7
41-45	8.8	8.1
>45	19.3	11.0
%	100.0	100.0
<i>n</i>	879	345

**Table II.**  
Stay duration by gender (%)

Stay duration	Male	Female
< 1 year	10.4	8.1
1 - 5 years	32.7	46.1
6 - 10 years	25.0	24.1
11 - 15 years	11.3	9.0
> 15 years	21.7	12.8
percent	100.0	100.0
number	879	345

**Table III.**  
Respondents by parental educational attainment levels (%)

Education Level	Male (n = 844)		Female (n = 339)	
	Mother	Father	Mother	Father
Below primary	10.6	3.2	4.7	0.6
Primary	19.2	11.7	13.6	7.4
Middle	9.6	5.4	6.5	5.3
High	27	15	30.4	13.9
Bachelors	26.7	42.4	32.7	37.5
Masters	4.2	11.9	7.4	19.5
Doctorate	2.7	10.2	4.7	15.6
Not known	0.1	0.2	0	0.3

Test of Independence of Mother's Education between Male and Female Samples  $\chi^2(7) = 28.70^{***}$   
 Test of Independence of Father's Education between Male and Female Samples  $\chi^2(7) = 28.48^{***}$

Notes: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010; Cell percentages sum to 100 across columns; n is the sample size excluding missing responses.

**Table IV.**  
Highest degree by level and country (%)

Highest Degree	Highest Degree Obtained in	
	Foreign Country	Turkey
Bachelors	7.3	55.9
Masters	45.5	29.8
Doctorate	47.2	14.4
Total percent	100.0	100.0
Total number	841	383
Test of independence	$\chi^2(2) = 369.90^{***}$	

Note: \*\*\* p < 0.001, \*\* p < 0.005, \* p < 0.010

**Table V.**  
Initial and current return intentions (%)

Current Intentions	Number	Initial Intentions		
		Return ( <i>n</i> = 631)	Undecided ( <i>n</i> = 446)	Stay ( <i>n</i> = 147)
Definitely return, plans	54	83.3	14.8	1.9
Definitely return, no plans	272	74.3	23.2	2.6
Return probable	416	51.7	43.3	5.1
Return unlikely	401	36.7	42.9	20.5
Definitely not return	81	27.2	28.4	44.4
Total	1224			
Test of Independence		$\chi^2(8) = 232.16^{***}$		
Measures of ordinal-ordinal association:		gamma = 0.5776; ASE = 0.032 Kendall's tau-b = 0.3921; ASE = 0.024		

*Notes:* \*\*\*  $p < 0.001$ , \*\*  $p < 0.005$ , \*  $p < 0.010$ ; Cell percentages sum to 100 across rows; ASE refers to the asymptotic standard error; Gamma and Kendall's tau-b statistics are two measures of ordinal-ordinal association (Agresti, 1984).

**Table VI.**  
Location where current job was found

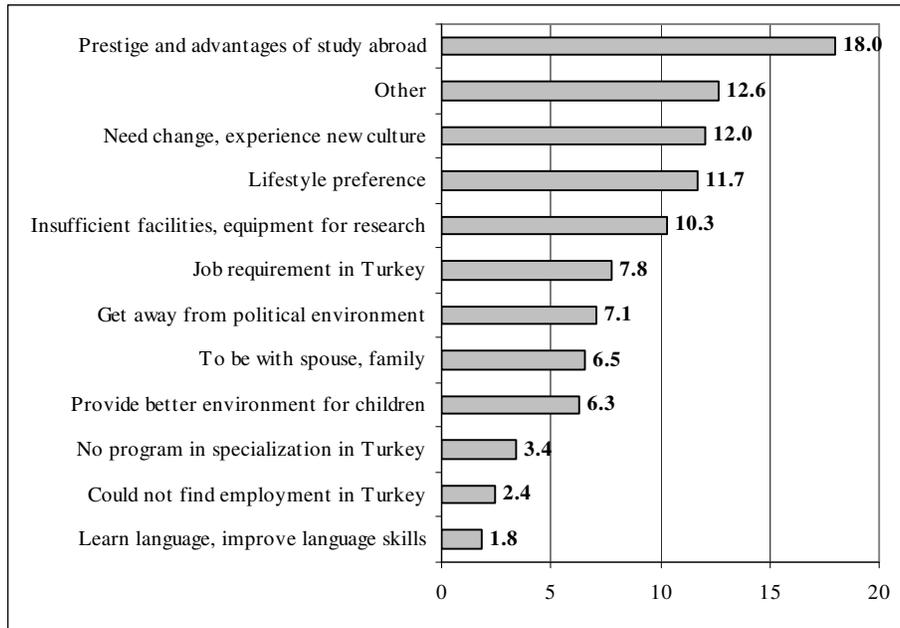
Location	<i>n</i>	%
Current country of residence	520	42.9
Turkey	357	29.5
Third Country	334	27.6
Total	1211	100.0

**Table VII.**  
Return intentions by whether respondent is  
working in an academic environment

Return Intentions	Non-Academic	Academic
Definitely return, plans	4.0	5.5
Definitely return, no plans	24.5	16.4
Return probable	34.7	32.2
Return unlikely	30.9	37.4
Definitely not return	5.8	8.6
%	100	100
<i>n</i>	876	348

*Notes:* Columns sum to 100; Academic refers to those working in a university, research center or hospital/medical center;  $\chi^2(4) = 15.23^{***}$  where \*\*\* denotes significance at the 1 percent significance level.

**Figure 1**  
Most Important Reason for Going Abroad (%)



*Notes:* Respondents were asked to choose the most important factor. There are 28 nonresponses; (*n* = 1196).

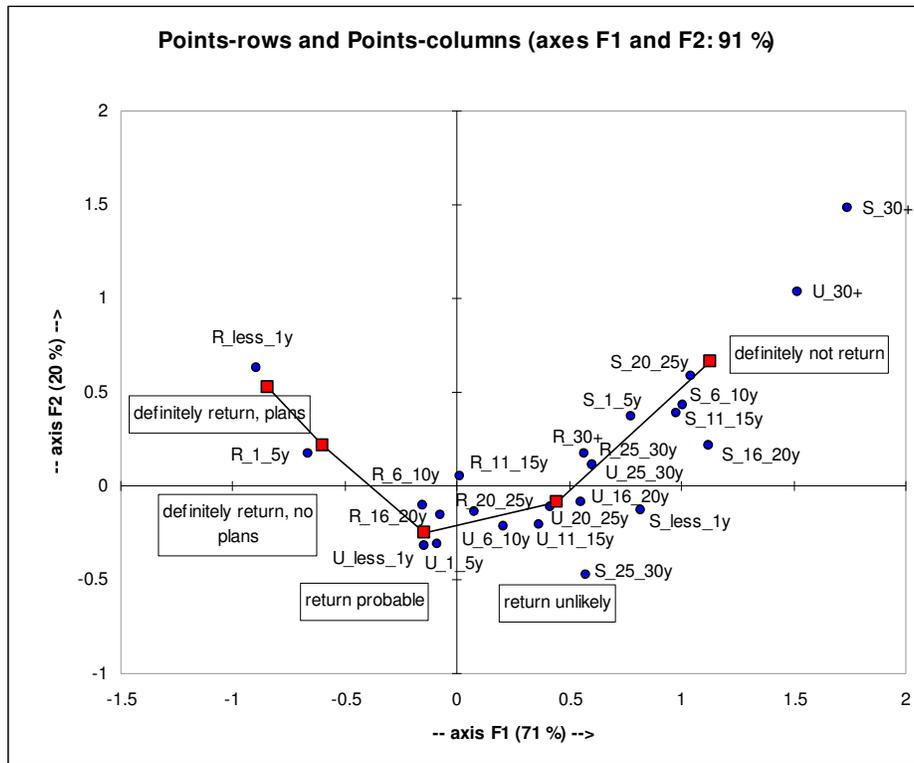
**Table VIII.**  
Evaluation of various pull factors

<b>PULL FACTORS</b> (valid $n = 1189$ )	<b>Very Imp.</b>	<b>Imp.</b>	<b>Some- what</b>	<b>Not Imp.</b>	<b>Not at all</b>	<b>Not Applic.</b>
A. High occupational income	39.2	39.9	12.3	3.3	1.1	4.2
B. Greater opportunity to advance in profession	44.9	31.2	10.2	4.0	1.6	8.1
C. Better work environment (flexible work hours, relaxed setting, etc.)	40.5	30.8	12.7	5.5	2.5	8.1
D. Greater job availability in my area of specialization	35.2	30.8	11.8	6.6	2.5	13.2
E. Greater opportunity for further development in area of specialty	38.4	31.5	10.5	5.1	1.9	12.5
F. A more organized and ordered environment in general	44.8	31.6	13.9	2.5	1.9	5.3
G. More satisfying social and cultural life	11.8	14.8	23.5	14.9	14.2	20.8
H. Proximity to important research or innovation centres	19.7	22.3	19.5	11.1	6.1	21.4
I. Spouse's preference to stay or spouse's job being in current country	18.0	13.0	11.8	7.1	8.9	41.2
J. Better educational opportunities for children / want children to continue their education	21.5	15.9	12.6	5.7	5.9	38.4
K. Need to finish or continue with current project	6.7	8.5	12.5	9.1	15.5	47.7
L. Other	4.4	0.4	0.4	0.0	0.1	94.7

**Table XI.**  
Evaluation of various push factors

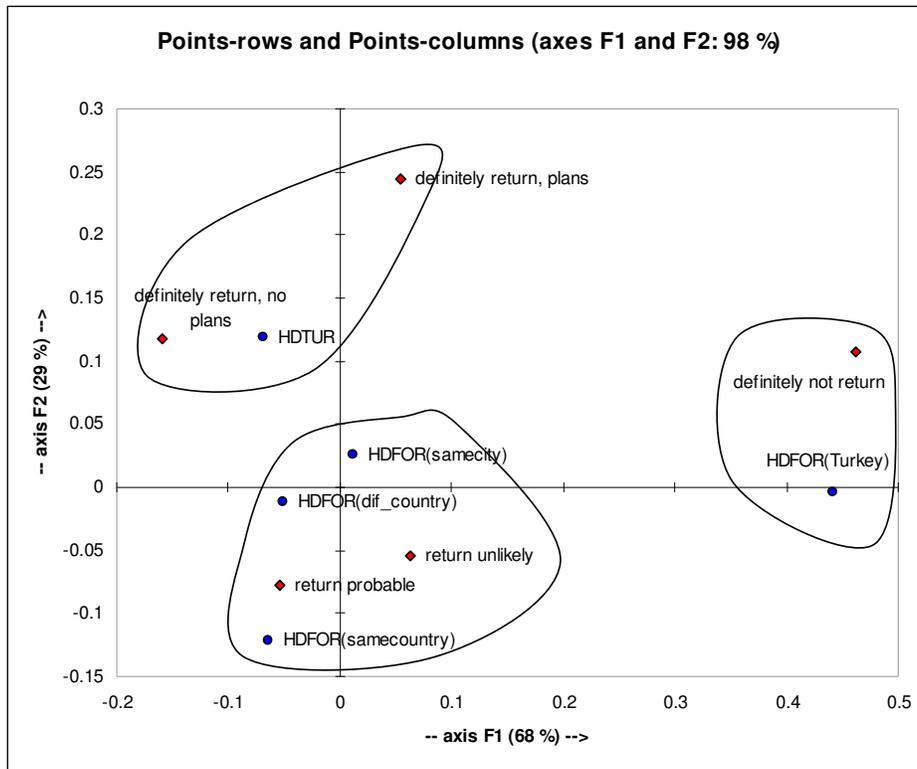
<b>PUSH FACTORS</b> (valid $n = 1189$ )	<b>Very Imp.</b>	<b>Imp.</b>	<b>Some- what</b>	<b>Not Imp.</b>	<b>Not at all</b>	<b>Not Applic.</b>
A. Low occupational income	37.6	30.8	16.0	4.7	1.9	9.1
B. Little opportunity for advancement in occupation	31.5	30.1	12.3	8.0	3.2	14.9
C. Limited job opportunities in my field of expertise	29.4	23.6	13.7	9.4	5.0	18.9
D. No opportunity for <u>advanced</u> training in my field	16.6	19.5	18.5	11.9	6.8	26.7
E. Being far from important research centres and from new advances	20.8	18.8	17.8	11.5	8.4	22.7
F. Lack of financial resources and opportunities to start up my business	15.1	14.0	16.7	12.5	8.3	33.4
G. Less than satisfying social and cultural life	10.0	14.6	15.7	12.6	17.6	29.5
H. Bureaucracy, inefficiencies in organization	54.5	24.9	10.6	3.4	1.6	5.1
I. Political pressures, discord	41.6	23.1	14.4	5.4	4.5	11.1
J. Lack of social security	35.0	24.1	15.2	7.7	4.9	13.2
K. Economic instability, uncertainty	59.6	24.1	9.7	2.2	1.2	3.3
L. Other	10.3	1.5	0.2	0.0	0.1	87.9

**Figure 2**  
Correspondence analysis of initial return intentions, current return intentions and stay duration



*Notes:* The boxed categories belong to the current return intentions variable; Initial return intentions are represented by R="return", U="unsure", and S="stay". See footnote 9 for a description of correspondence analysis.

**Figure 3**  
Correspondence analysis of return intentions, highest degree  
and location of initial work experience



- Notes:
1. HDTUR: Highest degree is from a university in Turkey  
HDFOR: Highest degree is from a foreign university
  2. Location of initial work experience after earning highest degree abroad is indicated in paranthesis as follows:
    - (samecity): Same city and country as that of highest degree;
    - (samecountry): Same country, but different city from that of highest degree;
    - (dif\_country): Different country than that of highest degree;
    - (Turkey): Initial work location is in Turkey.
  3. See footnote 9 for a description of correspondence analysis.

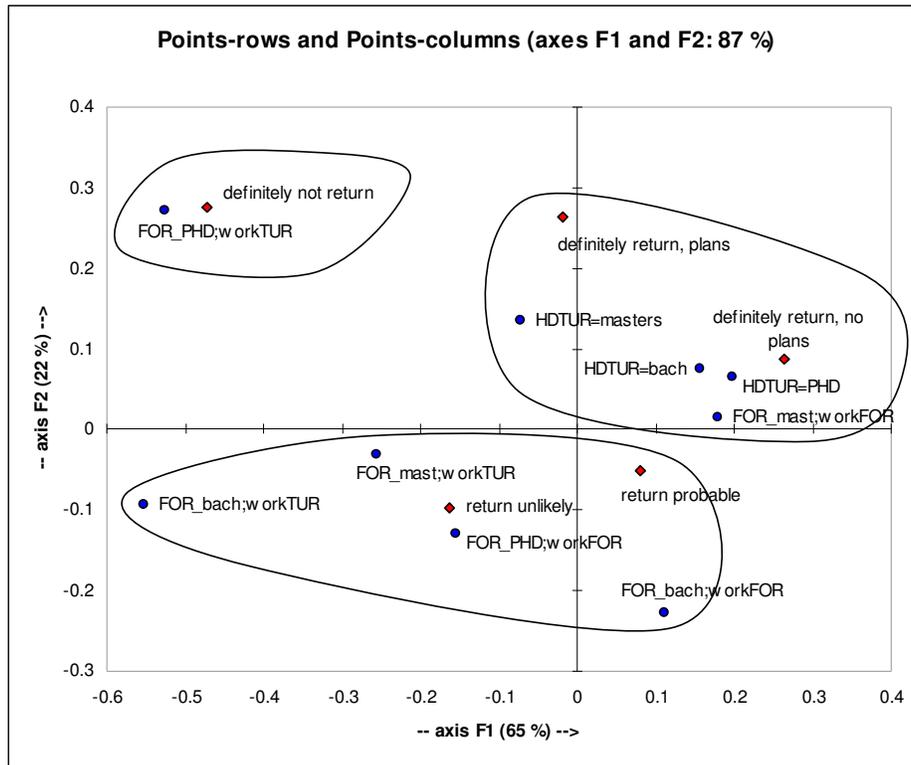
**Table X.**Type of on-the-job training and return intentions (%) (valid  $n = 1213$ )

Return Intentions	Type of On-the-Job Training				Total
	None	General	Industry Specific	Organiz. Specific	
Definitely return, plans	5.2	2.6	4.3	5.4	4.4
Definitely return, no plans	19.9	25.7	24.4	19.8	22.3
Return probable	32.1	36.1	35.4	35.1	34.1
Return unlikely	35.3	30.4	30.3	32.4	32.7
Definitely not return	7.6	5.2	5.7	7.2	6.6
Total percent	100	100	100	100	100
Total number	524	230	353	111	1,213

Notes: Cell percentages sum to 100 across columns;  $\chi^2(12) = 11.40$

**Figure 4**

Correspondence analysis of return intentions, level of highest degree and location of initial work experience



*Notes:* HDTUR=bach: Highest degree is a bachelor's degree from a university in Turkey;  
HDTUR=masters: Highest degree is a master's degree from a university in Turkey;  
HDTUR=PHD: Highest degree is a PHD degree from a university in Turkey.  
FOR\_bach: Highest degree is a bachelor's degree from a foreign university;  
FOR\_mast: Highest degree is a master's degree from a foreign university;  
FOR\_PHD: Highest degree is a PHD degree from a foreign university;  
which are further differentiated by whether respondent started their first full time job in Turkey (workTUR) or abroad (workFOR).

See footnote 9 for a description of correspondence analysis.

## APPENDIX

### *A closer look at the reasons for not returning: explanations by 11 selected respondents*

1. I believe the most important factors of brainpower not returning to Turkey are: 1) money and increased likelihood [for promoting] your career abroad; 2) economic and political stability and order abroad. However, the social environment and culture of foreign countries are very different from that of Turkey, and most people I know would return immediately if they knew the situation [was] more stable and predictable, and that they knew they would be financially secure.

2. I think the main factor [in not returning] is, lack of good jobs, lack of opportunities. People move away and they get treated so much better professionally and they get used to the salary and the opportunities other countries have to offer that they don't consider going back. Why would you move back and take a job cut, a pay cut and make your life more difficult. People move to make things better not worse.

3. My personal belief is that the most important reason is the business climate; and mostly the lack of entrepreneurial culture. My school (METU), TUBITAK and others [have spent] a lot of effort on technoparks, etc but nothing came out of them because they are isolated efforts.

4. In the early years (1970s) terror in Turkey was the main factor causing us to stay in [the] USA. Later on, political instability and lack of opportunities in our fields. But, overall, government policies to encourage growth of private sector, especially in terms of regulations, taxation, bureaucracy, corruption kept us working in USA rather than returning. Later on, after a year of living in Turkey, 1992-3, we decided to return to USA since we had two elementary school children and we felt we could not get them into acceptable private middle education schools, and comparably we could find better quality schools in USA for them.

5. Please add the mandatory military service as a reason to work abroad. For me, the main reason [for continuing to live] in the States is the business environment (lack of professional environment) and corruption.

6. Due to the fact I will not be able to find a job (a job close to this one) in Turkey, It will not be easy to [return]. I design, analyze and construct and manage the wireless sites.

7. I think that the brain drain argument implies two things: First, what I know is not known in Turkey; second, Turkey would be interested in implementing what I know. Turkey has professionals who are very capable. However, the majority of Turkish people and the governments are not listening to them. Under these circumstances, what would be the contribution of a Turkish professional to Turkey, if she returned to Turkey? Not much, I think.

8. I was planning to return to Turkey but ... the crisis in banking delayed my decision again. Another main reason not to return is the education of my children. Each time you decide to go back you remember the race they have to enter for their higher education.

9. I think this is a great concern to Turkey and that there are no strategic planning to recover any of the brain drain. While most of us would like to entertain the possibility [of coming] back, even for lesser opportunities, there is no structure that creates platforms for capturing the value of brains outside of Turkey. I would even say that there is some resentment and/or resistance to such attempts.

10. Everyone should realize [the] fact that we stay abroad because of the lack of scientific advancements and economic instability in Turkey. Like the movie says, "If you build it, they will come..." If the government / industry / institutions work together and build a good structure, why should we work for another country?

11. I advise many Turkish students who work for their PhD, either with me or in my institution, or field of work (Experimental Physics). My advice to them is to stay rather than to return. [...] The research budget of Turkey is negligible compared to many developed countries. That translates directly to the fact that there cannot be a sustained, competitive, internationally recognized research programs in Turkish institutions. Yet, this is precisely why young people spend 5-to-10 years extra after their Bachelor's degree to get their PhD's. So in a way, returning is tantamount to negating all of your hard work. Once the importance of original creative work is understood, and appreciated by the society, and the required resource allocations are made by the politicians, the situation will remedy itself over a period of time, like a decade.